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**CONTAINMENT MEASURES IN
ADOLESCENT PSYCHIATRIC CARE –
FOCUS ON MECHANICAL RESTRAINT**

by

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To Veronica, Lilja and Valo

Anja Hottinen

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ABSTRACT

The overall goal of the study was to describe and enhance the knowledge of the use of containment measures, especially mechanical restraint, in the inpatient psychiatric treatment of adolescents. The contributory goals of this study were to describe nurses', doctors' and patients' attitudes towards various containment measures in adolescent psychiatric wards, to ascertain the extent and nature of the mechanical restraint episodes during a one-year study period, and to describe the patients' experiences of mechanical restraint during their hospital treatment. The results of this study will provide valuable information for the further development of high standard mechanical restraint practices, both by diminishing their number and by developing the mechanical restraint conventions in the field of adolescent psychiatry. The study aims to improve the clinical care of mechanical restrained patients. The data were collected in four phases between October 2009 and April 2012 on adolescent psychiatric wards in the capital region of Finland.

Both the nurses and doctors working in seven closed adolescent psychiatric wards of the Hospital District of Helsinki and Uusimaa (HUS) expressed high levels of approval of containment measures. Adolescents evaluated containment measures more critically than the staff. Adolescents most approved of as-needed medication, intermittent observation and time out. The most disliked method was net bed. Adolescents rated mechanical restraint among the three least tolerated methods. The prevalence of mechanical restraint and the number of lengthy mechanical restraint episodes were high on adolescent psychiatric wards of the present study. Most mechanically restrained adolescents knew the reason for their mechanical restraint, experienced mechanical restraint with ambivalence seeing in it both benefit and harm, yet considered it as a form of punishment. In spite of this, most adolescents considered mechanical restraint as a necessary measure in an adolescent psychiatric hospital setting, mostly because of the violent behaviour of the patients. Adolescents were active commentators with many ideas about how to improve mechanical restraint practices.

This dissertation provides new information about the realization of various containment measures and mechanical restraint in adolescent inpatient psychiatric care. In order to improve clinical nursing wide-ranging and in-depth training is needed in adolescent psychiatric wards in order to reduce the use of containment measures. Also, new ways to manage crisis situations should be developed. Information, explanation about the procedures involved and debriefing should be offered to an under-aged patient in a manner which takes into account the developmental level of the adolescent. Reducing the number and shortening the length of mechanical restraint episodes is needed. Adolescent patients should play an active role in developing in-patient aggression management programmes in Finnish adolescent psychiatry.

Key words: adolescence, adolescent psychiatry, attitudes, containment measures, mechanical restraint, staff

Anja Hottinen

RAJOITETOIMET, ERITYISESTI SITOMINEN, NUORISOPSYKIATRISISSA HOITOTYÖSSÄ

Hoitotieteen laitos, Lääketieteellinen tiedekunta, Turun yliopisto, Suomi
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TIIVISTELMÄ

Tutkimuksen tavoitteena oli kuvata ja syventää tietoa rajoitetoimien, erityisesti sitomisen, käytöstä nuorisopsykiatrisessa vastentahtoisessa osastohoidossa. Tutkimuksen tavoitteena oli kuvata hoitajien, lääkäreiden ja potilaiden asenteita eri rajoittamiskeinoja kohtaan nuorisopsykiatrisessa osastohoidossa, kerätä tietoa yhden vuoden aikana tapahtuneiden sitomisten määrästä ja luonteesta sekä kuvata potilaiden kokemuksia sitomisesta nuorisopsykiatrisen osastohoidon aikana. Tutkimus tuottaa arvokasta tietoa korkeatasoisten sitomiskäytäntöjen kehittämiseen nuorisopsykiatrisessa osastohoidossa, sekä sitomisten määrää vähentämällä että sitomistapoja kehittämällä. Tavoitteena on parantaa sidottujen potilaiden kliinistä hoitoa. Tutkimusaineisto kerättiin suomalaisilla, pääkaupunkiseudulle sijoittuvilla, nuorisopsykiatrisilla osastoilla neljässä vaiheessa lokakuun 2009 ja huhtikuun 2012 välisenä aikana.

Helsingin ja Uudenmaan sairaanhoitopiirin (HUS) nuorisopsykiatrian erikoisalan seitsemän suljetun osaston hoitohenkilökunta sekä lääkärit suhtautuivat myönteisesti rajoittamistoimenpiteisiin. Nuorisopsykiatriset potilaat suhtautuivat rajoittamistoimenpiteisiin kriittisemmin kuin henkilökunta. Nuoret suhtautuivat myönteisimmin tarvittaessa annettavaan lääkitykseen, ajoittaiseen tarkkailuun ja kulun rajoittamiseen. Vähiten hyväksytty menetelmä oli verkkosänky. Nuoret arvioivat sitomisen kolmen vähiten hyväksytyyn menetelmän joukkoon. Sitomisen esiintyvyys ja pitkien sitomisten määrä olivat korkeita tutkimukseen valituissa yksiköissä. Useimmat sidotut nuoret tiesivät syyn sitomiseensa, suhtautuivat siihen ambivalentisti nähden siinä sekä hyötyä että haittaa, pitäen sitä kuitenkin rangaistuksena. Huolimatta tästä, suurin osa haastatelluista nuorista koki, että joissain tilanteissa sitomista tarvitaan nuorisopsykiatrisessa osastohoidossa. Nuorilla oli monia ehdotuksia, kuinka parantaa sitomista käytännön osastohoidossa.

Tämä väitöskirja tuottaa uutta tietoa eri rajoittamistoimenpiteiden ja sitomisen toteuttamisesta nuorisopsykiatrisessa osastohoidossa. Käytännön hoitotyön parantamiseksi nuorisopsykiatrisilla osastoilla tarvitaan laaja-alaista ja syvälle luotaavaa koulutusta, jotta rajoittamistoimenpiteiden määrää voidaan vähentää. Myös kriisitilanteiden hallintaan tarvitaan uusia keinoja. Tietoa, kuvausta toimenpiteistä ja tilanteiden käsittelyä jälkikäteen tulee tarjota ala-ikäiselle potilaalle hänen kehitystasonsa huomioiden. Sitomisten määrää tulee vähentää ja niiden kestoja lyhentää. Nuorten tulee olla aktiivisesti mukana kehittämässä aggression hallintamenetelmiä suomalaisessa nuorisopsykiatrisessa osastohoidossa.

Asiasanat: nuoruusikä, nuorisopsykiatria, asenteet, rajoittamistoimenpiteet, sitominen, henkilökunta

TABLE OF CONTENTS

ABSTRACT	4
TIIVISTELMÄ	5
TABLE OF CONTENTS	6
LIST OF FIGURES, TABLES AND APPENDICES	8
ABBREVIATIONS	9
LIST OF ORIGINAL PUBLICATIONS	10
1 INTRODUCTION	11
2 LITERATURE REVIEW	15
2.1. Adolescents in the Finnish mental health care system	15
2.1.1. Definition of adolescence and prevalence of psychiatric disorders in adolescence	15
2.1.2. The adolescent mental health care system in Finland	16
2.1.3. The Finnish Mental Health Act related to adolescent psychiatric care	17
2.1.4. Involuntary treatment of adolescents	17
2.2. Mechanical restraint	18
2.2.1. Procedures in mechanical restraint in Finland	19
2.2.2. Characteristics of mechanically restrained adolescents	19
2.3. Attitudes towards containment measures	20
2.3.1. Staff’s attitudes towards various containment measures.....	20
2.3.2. Staff’s attitudes towards mechanical restraint	20
2.3.3. Patients’ attitudes towards various containment measures	21
2.3.4. Patients’ experiences of seclusion/ mechanical restraint.....	21
2.4. Summary of the literature	22
3 AIMS OF THE STUDY	24
4 METHODOLOGY	26
4.1. Rationale of the methodological approaches.....	26
4.2. Study setting	26
4.3. Instruments	27
4.4. Data collection.....	29
4.5. Study sample	29
4.6. Data analyses	30

4.7. Ethical issues	31
5 RESULTS.....	34
5.1. Attitudes towards various containment measures	34
5.1.1. Staff's attitudes towards various containment measures.....	34
5.1.2. Adolescents' attitudes towards various containment measures.....	35
5.2. Frequency and features of mechanical restraint	36
5.3. Adolescents' experiences and opinions of mechanical restraint	38
5.4. Summary of the results	40
6 DISCUSSION	42
6.1. Validity and reliability of the study	42
6.2. Main findings.....	47
6.2.1. Staff's attitudes towards various containment measures.....	47
6.2.2. Adolescents' attitudes towards various containment measures compared to those of the staff	48
6.2.3. Frequency and features of mechanical restraint.....	48
6.2.4. Adolescents' experiences and opinions of mechanical restraint	50
6.3. Ethical issues in research on adolescents	52
6.4. Conclusions	55
6.5. Implications	56
6.6. Suggestions for further studies	57
ACKNOWLEDGEMENTS	58
REFERENCES.....	61
APPENDICES	69
ORIGINAL PUBLICATIONS I-IV.....	81

LIST OF FIGURES, TABLES AND APPENDICES

FIGURES

Figure 1. Data collection in Phase I (1/2009-3/2010).....	29
Figure 2. Data collection in Phase IV (1/2011-4/2012).....	30

TABLES

Table 1. Phases, designs, methods of data collection and analysis of the study	26
Table 2. Total approval scores of eleven containment methods in the Attitude to Containment Measures Questionnaire (ACMQ) among 81 adolescent patients (58 girls and 23 boys) and 128 staff members (95 women and 33 men; 96 nurses and 32 doctors).....	35
Table 3. Primary ICD-10 diagnoses, suicidality, aggressive behavior and medication of 47 mechanically restrained adolescents with altogether 161 mechanical restraint episodes from the 1 st of January 2009 to the 31 st of December 2009.	37
Table 4. Experiences and opinions of mechanically restrained adolescents (n=15) ...	39

APPENDICES

Appendix 1. Attitude to Containment Measures Questionnaire (ACMQ).....	69
Appendix 2. Question formula used in the interviews with the mechanically restrained adolescents (modified from Keski-Valkama 2010)	80

ABBREVIATIONS

AACAP	American Academy of Child and Adolescent Psychiatry
CE	Council of Europe
CIOMS	Council for International Organizations of Medical Sciences
DE	Denmark
DSM-IV-TR	Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision
ETENE	National Advisory Board on Health Care Ethics
EU	European Union
C-GAS	Children's Global Assessment Scale
HUCH	Helsinki University Central Hospital
HUS	Hospital District of Helsinki and Uusimaa
ICD-10	International Classification of Diseases, 10 th Revision
IM	Intra muscular
NL	Netherlands
PICU	Psychiatric intensive care unit
SD	Standard Deviation
SPSS	Statistical Package for the Social Sciences
UK	United Kingdom
VALVIRA	National Supervisory Authority for Welfare and Health
WHO	World Health Organization
WMA	World Medical Association

LIST OF ORIGINAL PUBLICATIONS

This thesis is based on the following publications, which are referred to in the text by their Roman numerals I-IV:

- I Hottinen A., Välimäki M., Sailas E., Putkonen H., Joffe G., Noda T., Lindberg N. 2011. Attitudes towards different containment measures: a questionnaire survey in Finnish adolescent psychiatry. *Journal of Psychiatric and Mental Health Nursing* 19 (6), 521-527.

- II Hottinen A., Välimäki M., Sailas E., Putkonen H., Joffe G., Noda T., Lindberg N. 2012. Underaged patients' opinions toward different containment measures: a questionnaire survey in Finnish adolescent psychiatry. *Journal of Child and Adolescent Psychiatric Nursing* 25 (4), 219-223.

- III Hottinen A., Välimäki M., Sailas E., Putkonen H., Joffe G., Puukka P., Noda T., Lindberg N. 2012. Mechanical restraint in adolescent psychiatry: a Finnish register study. *Nordic Journal of Psychiatry*. DOI:10.3109/08039488.2012.699552

- IV Hottinen A., Välimäki M., Keski-Valkama A., Sailas E., Putkonen H., Joffe G., Noda T., Lindberg N. 2012. Adolescent in-patients' view of mechanical restraint: a Finnish interview study. *Psychiatria Fennica* 43, 97-111.

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1 INTRODUCTION

Adolescents – among other human beings - have a basic human right to mental health. Mental health is fundamental to all human and social progress. It is a requirement for a happy life and societal cohesion. Around 80% of adolescents in the European Union enjoy good mental health. (European Commission et al. 2004, Jané-Llopis & Braddick 2008, ETENE 2009, ETENE 2010a.) However, approximately 10 to 20% of adolescents suffer from mental health problems. The prevalence estimates among adolescents vary across European countries (ranging from 9.5% in the United Kingdom- to 22% in the Netherlands and Germany), the estimate for Finland being 15.1%. The data is insufficient and not comparable due to the use of different study methodologies. (Verhulst et al. 1997, Puura K et al. 1998, Ford et al. 2003, WHO 2005, Ravens-Sieberer et al. 2007, Jané-Llopis & Braddick 2008.) Later the prevalence estimate of mental health problems among Finnish adolescents has been reported to be 15-25% (Marttunen & Kaltiala-Heino 2007, Pylkkänen & Laukkanen 2011). The incidence of self-harming is estimated to be 10-40 times more common than that of actual suicide (1:9 among males and 1:42 among females) in European countries. It is also common among female adolescents, both abroad and Finland. (Evans et al. 2005, Madge et al. 2008, Laukkanen et al. 2009.)

Mental disorders and mental health enhancement in Europe should be handled with respect for human rights. This should include the rights of adolescents, as the European Social Charter, a Council of Europe treaty which guarantees social and economic human rights, has reflected. When enacting the adolescents' rights, their participation and involvement in their treatment is crucial. This diminishes the stigma, fear and feelings of incapacitation associated with their mental health problem. (United Nations 1989, Jané-Llopis & Braddick 2008.)

The United Nations' (1948) Declaration of Human Rights states, that everyone has the right to life, liberty and security. Restraint means restriction of liberty, action or movement. It is a measure or condition that keeps someone under control. (Brown & Tooke 1993, The Oxford Dictionary.) Mechanical restraint, in turn, refers to confining the adolescent to bed by using belts. In recent decades psychiatry has explicitly tried to reduce the use of coercion, which can be seen in the international ethical guidelines issued to the profession (World Psychiatric Association 1977, 1996, Kaltiala-Heino et al. 2003.) The Ministry of Social Affairs and Health (2009) in Finland has designed a special program in order to diminish the use of coercion as much as 40%.

The new Health Care Act (1326/2010) in Finland emphasizes promoting client-orientation in the provision of health care services. The Mental Health Act/Section 22a (1423/2001) states that a patient's right of self-determination and other fundamental rights may be limited only to the extent necessary for the treatment of the illness or for the person's safety or the safety of others, by giving the necessary treatment of physical illness, by prohibiting to leave the premises of the hospital or the care unit, by taking

possession of personal property or by limiting the contacts of the person. The measures shall be undertaken as safely as possible and with respect for the patient's dignity. Health care patients in Finland are entitled to be treated with dignity, their privacy respected, and their individuality and culture taken into account. Treatment should be provided on the basis of mutual consent between health care providers and patients. This also applies to adolescent patients, whose opinions are sought when they are old enough to express them. The opinion of an adolescent patient has to be assessed with regard to his/her age or level of development. (United Nations 1989, Rights of patients 2005, Act on the Status and Rights of Patients 7851992.)

The Ministry of Social Affairs and Health is responsible for ensuring effective services for people with mental health problems. The Ministry determines the guidelines for development of services, drafts relevant legislation and steers the implementation of reforms. It also supervises the quality of services through the National Supervisory Authority for Welfare and Health (Valvira) and the State Provincial Offices. Cooperation between different actors is important in promotion of mental health as well as in treatment of mental health disorders.

According to the National Institute for Health and Welfare (2012), in 2010 as many as 2182 13- to 17- year old adolescents were treated in psychiatric hospitals. Among them, there were altogether 660 days of involuntary treatment. This was 205 days/100 000 adolescent inhabitants. The number of involuntary treatment days have varied a bit during the recent years (2006: 146 days/100 000 inhabitants; 2007: 206/ 100 000; 2008: 203/ 100 000; 2009: 172/ 100 000). During the year 2010 there were altogether 99 (31/100 000 adolescent inhabitants) mechanical restraint episodes among 13- to 17-years old adolescents. The number of mechanical restraint episodes has not been varied much during the recent years. Differences in nursing culture rather than medical reasons are crucial in using restraint (Wahlbeck 2005).

Restrictions are used in psychiatric treatment to treat, help, or cure the patient, and to control her/him (Kaltiala-Heino et al. 2003). The use of containment measures in managing the aggression of adolescent psychiatric in-patients is a controversial issue (Bath 1994, Earle & Forquer 1995, Mesham 1995). Containment measures have been shown to be an effective techniques in helping adolescents to de-escalate from situations in which they are harmful to themselves, others, or property (Masters et al. 2002). However, given the potential misuse of them, legal and ethical challenges raise questions about the appropriateness of these treatment techniques (Kaltiala-Heino et al. 2003, Huckshorn 2004). In daily practice, nurses are constantly confronted with ethical questions and decision-making. Good nursing care is an ethically grounded task. However, in clinical practice, there is growing concern about implementing good ethical nursing practice. (Dierckx de Casterle et al. 2008.) In everyday practice, situations involving conflicting values and beliefs pose the most problematic challenges to ethical practice (Ham 2004). Dierckx de Casterle et al. (2008) claimed that nurses habitually react in a conformist way in daily ethical conflicting situations, acting according to conventional ward rules and

norms rather than creating situation-related actions. Instead of making their own ethical decisions, environmental factors seem to guide them in challenging situations.

Most studies related to mechanical restraint in adolescent psychiatry are from the United States. In the study by Delaney & Fogg (2005), from 100 young people admitted to inpatient units, 69% were mechanically restrained during the study period of 14 months. Most of those (93%) mechanically restrained were given a diagnosis of a psychotic disorder. According to a Finnish study, about 40% of child and adolescent patients had experienced some type of restraint procedure during their in-patient treatment period (Sourander et al. 2002). In Finnish adolescent psychiatry, the use of containment measures is poorly researched and very little is known either in terms of the frequency of use or the general rationales which guide the use of different types of containment measures in adolescent psychiatric in-patient treatment. It is a matter of justice that minorities or subpopulations should not be excluded from the benefits of research or discovery. Adolescents can be considered to be such a subpopulation. It is therefore unethical if adolescents are denied the benefits of new interventions, if research is never conducted among adolescents to determine the efficacy and safety of procedures. (Davidson & O'Brien 2009.) If the research has been conducted among adults, the results could not be applied directly to adolescents. There is also increasing concern that under-aged persons in general should not be disadvantaged through lack of knowledge due to reduced research activity. (Goodyear et al. 2007, Davidson & O'Brien 2009).

Coercion in psychiatric treatment is challenging. It is difficult to develop treatment on psychiatric inpatient units in a more ethical direction because of the deep-rooted treatment traditions and attitudes (Huckshorn 2006). In Finland, containment measures have been studied mostly in adult psychiatry. (Keski-Valkama 2010, Kontio 2011.) The aim of this study is to describe and enhance the knowledge of the use of containment measures, especially mechanical restraint, in the inpatient psychiatric treatment of adolescents. The contributory goals of this study were to describe nurses', doctors' and patients' attitudes towards various containment measures, to ascertain the amount and nature of the mechanical restraint episodes over one year, and to describe the patients' experiences of mechanical restraint. The results of the study will provide valuable information for the further development of high-standard mechanical restraint practices, both by reducing the number of it and by developing the mechanical restraint conventions in adolescent psychiatric inpatient care. The dissertation aims to improve the clinical care of restrained patients. The National Target and Action Plan highlights the use of scientific knowledge as a basis for nursing action (Ministry of Social Affairs and Health 2003). The study topic is essential in giving assistance to implement the national guidelines (Ministry of Social Affairs and Health 2009) by producing scientific knowledge as a basis for developing mechanical restraint practices of adolescents. There is also a demand for user involvement in developing aggression management practices, since, in adult psychiatry, patient satisfaction research has shown that patients are often dissatisfied to the use of containment measures (Meehan et al. 2004, Kuosmanen et al. 2006). Service user

involvement has also been recognized at the national level of Finnish mental health care (Ministry of Social Affairs and Health 2009).

The target group of the present study comprised 13- to 17-year old inpatients on adolescent psychiatric wards as well as nurses and physicians working in these wards in the Hospital District of Helsinki and Uusimaa (HUS). This study with four phases aims to explore the use of containment measures, especially mechanical restraint, in adolescent psychiatric wards and it was implemented in the field of clinical nursing science. It is part of the Research and Development Project on Seclusion and Restraint in Psychiatric Hospitals in Finland and Japan (Sakura).

This study was conducted in the field of clinical nursing in HUS focusing on the client-orientation of adolescents in mechanical restraint. *Patient* is understood as an individual who is treated on an adolescent psychiatric ward either voluntarily or involuntarily and who is suffering from mental health problems (Specialized Medical Care Act 1062/1989, Mental Health Act 1116/1990). The patient is considered an active participant in all phases of treatment considering his/her developmental, physiological and psychological level (European Charter of Patients' Rights 2002). *Health* is understood as adolescents' self-reported state of mental health or disorder or mental health staff's evaluation of an adolescent's state of health. In this study, most of the adolescents were suffering from severe mental health disorders (WHO 2007). *Nursing* in this study is understood as the relationship between adolescent and nurse in adolescent psychiatric wards. This relationship includes personal and interpersonal skills such as empathy, empowering and the therapeutic relationship (Barker et al. 1997). The *environment* of this study is acute adolescent psychiatric wards in the Hospital District of Helsinki and Uusimaa, both in Helsinki University Central Hospital (HUCH) (4 closed wards and 7 open wards) and the Area of Hyvinkää Hospital District (3 closed wards and one open ward) four hospitals providing specialized medical care for adolescents suffering from mental health problems or disorders (Specialized Medical Care Act 1062/1989, Mental Health Act 1116/1990).

The study deals especially with involuntary treatment of adolescents. In this study involuntary treatment refers to the involuntary legal status of an adolescent treated in a closed adolescent ward regardless of her/his own will (Mental Health Act 1116/1990). Containment measures here refer to the action of keeping a harmful adolescent under control or within limits (The Oxford Dictionary). Mechanical restraint in this study refers to confining the adolescent to a bed using belts.

2 LITERATURE REVIEW

2.1. Adolescents in the Finnish mental health care system

2.1.1. *Definition of adolescence and prevalence of psychiatric disorders in adolescence*

The first use of the term adolescence appeared in the fifteenth century. The term is derived from the Latin word *adolescere*, which means to grow up or to grow into maturity (Muuss 1990). Adolescence is a period of life when an individual transfers from childhood and his/her biological, cognitive, psychological and social characteristics become more adult-like. This developmental stage is initiated by the onset of puberty. Adolescence can be divided into three periods: early (12 -14 years), middle (15- 16 years) and late adolescence (17-19 years and beyond) (Blos 1962, Richter 1997). Each of these periods is characterized by certain developmental tasks. The key developmental tasks are the achievement of biological and sexual maturity, the development of personal identity, the development of intimate sexual relationships and the establishment of independence and autonomy (Christie & Viner 2005).

In early adolescence, rapid biological changes and reassessment of body image take place. Impulse control problems, irritability, increased conflicts with parents as well as rapid changes in mood and interests are common at this stage. Early moral concepts, early sexual orientation as well as emotional separation from parents can be seen. In middle adolescence biological changes are usually complete for females, whereas males are still maturing. Abstract thinking proceeds, as do the development of personal and sexual identity. Intimate and romantic relationships start to exist. In late adolescence, identity is differentiated. Stable and equal intimate relationships can be achieved. Decisions about professional and educational goals and leaving home are made. (Garnefski & Diekstra 1996, Steinberg & Morris 2001, Gutgesell & Payne 2004, Christie & Viner 2005.)

Adolescence is a risk period for the emergence of many psychiatric disorders (Kim-Cohen et al. 2003, Kessler et al. 2005). The incidence of psychiatric disorders increases from childhood through mid-adolescence and peaks in late adolescence and young adulthood (Newman et al. 1996). The prevalence of both depression and conduct disorder in adolescent community samples has been estimated to be approximately 5-10% (Birmaher et al. 1996, Lewinsohn et al. 1998, Loeber et al. 2000, Frick 2006). According to a study by Pelkonen & Marttunen (2003), 20-25% of 13- to 16-year-old Finnish girls and 15% of boys had considered suicide during the previous year. The prevalence of schizophrenia-related disorders in adolescence has been estimated to be 1-2% (Kessler et al. 1994, Patel et al. 2007).

2.1.2. The adolescent mental health care system in Finland

In Finland, mental health services should be organized according to the health care needs of the inhabitants and enough treatment should be obtainable (Primary Health Care Act 66/1972 § 14, subsection 2a, Act on Specialized Medical Care 1062/1989 § 3 and Mental Health Act 1116/1990, Chapter 1, § 4). The goal of health care in Finland is to maintain and improve people's mental and physical functional capacity. The system is based on preventive health care and well-run, comprehensive health services. The municipalities are responsible for organizing outpatient mental health care and rehabilitation services for their inhabitants (Ministry of Social Affairs and Health 2004, National Institute for Health and Welfare 2010, 2012). Public health services are divided into primary health care and specialized medical and hospital care, arranged respectively by municipal health centres and hospital districts. Each municipality belongs to a particular hospital district. At primary level, adolescent psychiatric services are mainly organized by the school health care system. Adolescents can also use the services of health centres, and many municipalities have founded primary level walk-in facilities. Specialized mental health care is organized by hospital districts comprising both outpatient and inpatient services (Ministry of Social Affairs and Health 2004, National Institute for Health and Welfare 2010). Good mental health services for young people include access to early treatment, which has a significant preventive impact.

Finland was the first country in Europe to acknowledge adolescent psychiatry as an independent speciality of medicine with its own service regime. In Finland adolescent psychiatric services have been provided since 1959 (in Pitkänieni hospital, the ward for those aged 12-15, closed down as separate unit in 1979). At that time adolescent psychiatry was part of the psychiatric services in Finland. From 1979 adolescent psychiatry was a distinct subspeciality within psychiatry and from 1994 an independent medical speciality. Since then education and research in adolescent psychiatry have gained strength in Finland. (Pylkkänen 1998.)

Outpatient care is the preferred form of psychiatric treatment, also for adolescents (Ministry of Social Affairs and Health 2004). In 2001 the first care guarantee based on the legislation was stipulated for child and adolescent psychiatry in Finland. Accordingly, in non-emergency treatment, one must gain access to examinations in specialized medical care within three weeks of receipt of the referral, and to treatment within three months. (Laukkanen et al. 2003.) The quantitative objective recommended for services is that about 4% of young people (13-22-year-olds) per year should have access to psychiatric services (NUOTTA Project 2003).

The first still active ward for adolescent psychiatry in Finland was established in 1961, located in Hesperia hospital in Helsinki (nowadays part of the adolescent unit in HUCH). Kellokoski hospital in Finland got their first adolescent psychiatry ward in 1972. Most of the adolescent wards were opened at the beginning of the 1990's in conformity with the Mental Health Act (1116/1990) which required adolescents under 18 years old to

be treated separately from adults. The history of Finnish adolescent psychiatry has been characterized by institutional care, and the treatment culture has been restrictive (Pylkkänen 1998.). However, in recent years versatile adolescent out-patient services have been developed (Pylkkänen & Laukkanen 2011).

2.1.3. The Finnish Mental Health Act related to adolescent psychiatric care

According to the Finnish Mental Health Act (1116/1990), a psychiatric patient who is under 18 years old, can be involuntarily hospitalized if s/he is psychotic or suffering from a serious mental disorder, and, due to the illness, is in need of treatment because failure to treat her/him would result in a deterioration of her/his mental illness (need for treatment), or would endanger her/his health or safety (danger to self), or other persons' health or safety (danger to others), and other treatment options are inadequate. The concept of serious mental disorder has been clarified in a report of the Ministry of Social Affairs and Health (Kaltiala-Heino 2003).

A doctor independent of the receiving hospital examines the patient in order to evaluate if it is likely that the commitment criteria are fulfilled. The doctor writes a referral for observation. In the hospital, the patient is placed under observation, which can last for a maximum of 4 days. At the end of the observation period, the psychiatrist in charge of the observation writes a recommendation as to whether or not the patient should be detained. The chief psychiatrist in charge then makes the decision as to whether the patient is to be detained in involuntary treatment or not. Before the decision is made, the opinion of the patient her/himself as well as the under-aged person's parents or guardians must be heard. The decision concerning a patient under 18 years old is immediately subjected to confirmation by the administrative court. Minors committed to psychiatric care have to be treated in adolescent psychiatric wards separately from adult patients.

2.1.4. Involuntary treatment of adolescents

According to a nationally representative retrospective register study, between the years 1996 and 2000, 22% of psychiatric inpatient admissions of adolescents were involuntary (Kaltiala-Heino 2004). Of the admissions of boys, 22.2%, and of girls, 22% were involuntary. There was considerable variation in the proportion of involuntary admissions according to health care districts, ranging from 5.6% to 35.6%. During the study period, the proportion of involuntary admissions increased from 17% to 26%. In a recent study by Kaltiala-Heino (2010), the study group consisted of 94 voluntarily and 93 involuntarily referred adolescents, who were sent to the Adolescent Unit of one Finnish University Hospital during the years 2004 and 2006. The involuntarily referred adolescents more often expressed suicidal ideation and talk, psychotic symptoms as well as hostile and violent behaviour than did the adolescents referred on a voluntarily basis.

Every third (n= 106) of all 13-18-year-old adolescents was sent to involuntary treatment to the Unit of Adolescent Psychiatry of one Finnish university hospital during the period

1994 - 2002. After an observation period, 39 (36.8%) out of 106 adolescents were involuntarily committed. Patients committed to involuntary treatment had significantly more often psychotic symptoms and they were more often placed in special education than those released after the observation period. The length of hospital treatment was significantly longer among the committed adolescents than the released ones. (Khenissi et al. 2004.)

After the observation period, 42 (22.5%) out of 187 hospitalized adolescents were detained in involuntary treatment. Involuntarily detained adolescents were more often diagnosed with schizophrenia spectrum disorders and less frequently with mood disorders than those treated on a voluntary basis. Those detained in involuntary care received more often neuroleptic medication and anxiolytics than voluntarily treated adolescents. Those detained involuntarily stayed longer in hospital than those treated on a voluntary basis. (Kaltiala-Heino 2010.)

Committed adolescents have been studied and 12 (30.8%) out of 39 were diagnosed with mood disorders, 9 (23.1%) with behavioural and emotional disorders, 7 (18.4 %) with schizophrenia spectrum disorders, and 5 (13.2%) with neurotic disorders as a primary diagnosis. Thirty (76.9%) of the patients had some type of suicidal behaviour and 18 (46.2%) showed some type of violent behavior. 9 (23.1%) of the adolescents abused alcohol, and 7 (17.9%) had serious problems with drugs. Sixteen (41%) involuntarily treated adolescents suffered from psychotic symptoms. 12 (30.8%) adolescents were treated with antipsychotic medication, 8 (20.5%) with antidepressants, and 10 (25.6%) with anxiolytics, hypnotics and sedatives. (Khenissi et al. 2004.)

In the study by Kaltiala-Heino (2010), 33 (78.6 %) out of 42 committed adolescents showed psychotic symptoms, 26 (61.9%) expressed suicidal ideation and talk, 26 (61.9%) had depression, 15 (35.7%) self-harming behaviours, 15 (35.7%) violent behaviour, 14 (33.3%) hostile behaviour and 12 (28.6%) alcohol abuse. Twenty-three (54.8%) of the committed adolescents were given a diagnoses of schizophrenia spectrum disorders, 8 (19.0%) mood disorders, 6 (14.3%) behavioural and emotional disorders, 3 (7.1%) eating disorders, 1 (2.4 %) anxiety disorders and 1 (2.4 %) disorders of psychological development as a primary diagnosis. Thirty-five (83.3%) of the committed adolescents were treated with antipsychotic medication, 11 (26.2%) with anxiolytics and 2 (4.8%) with antidepressants. Psychotic symptoms, schizophrenia spectrum disorders and mood disorders seem to lead to involuntary treatment among adolescents.

2.2. Mechanical restraint

Mechanical restraint of minors i.e. confining the patient to bed using belts has been reported to be a controversial issue (Sourander et al. 2002, Ellilä et al. 2008). Some researchers have proposed the benefits of restraint in helping adolescents with psychiatric disorders to establish their internal control or helping them to de-escalate from situations in which they are harmful either to themselves, others or property (Masters et al. 2002).

On the other hand, in some recent studies (Mohr et al. 2003, Delaney 2006, Keski-Valkama et al. 2010a) the benefits of restraint have been questioned due to potential misuse of it, its legal and ethical issues, as well as adverse physical events, sometimes fatal (Kaltiala-Heino et al. 2003, Mohr et al. 2003, Nunno et al. 2006). The critics of restraint have argued that especially children with histories of abuse and neglect perceive these interventions to be aggressive and putative, creating an environment that may impede effective treatment (Fox 2004).

The use of mechanical restraint is clearly an intervention of last resort (Larson et al. 2008). According to the American Academy of Child and Adolescent Psychiatry guidelines (AACAP 2001), the use of restraint should always be limited to situations when prevention strategies are ineffective and an adolescent is in danger of hurting him/herself or others. The Finnish Mental Health Act/Section 22a (1423/2001) states that a patient's right of self-determination and other fundamental rights may be limited only to the extent necessary for the treatment of the illness or for the person's safety or the safety of others, by giving the necessary treatment of physical illness, by prohibiting to leave the premises of the hospital or the care unit, by taking possession of personal property or by limiting the contacts of the person. In recent decades, psychiatry has explicitly tried to reduce the use of coercive measures (Donat 2003, D'Orio et al. 2004, Jonikas et al. 2004, Delaney 2006). In Finland, a special programme has been designed in order to reduce the use of both seclusion and mechanical restraint by as much as 40% by the year 2015 (Ministry of Social Affairs and Health 2009). This will be carried out not only by creating new practices, but also by changing attitudes, as differences in nursing culture, rather than medical reasons, are crucial in the use of containing measures (Wahlbeck 2005). According to a recent study by Keski-Valkama et al. (2007), deep-rooted treatment traditions and attitudes determine the use of seclusion and mechanical restraint at least as much as safety requirements or patients' rights.

2.2.1. Procedures in mechanical restraint in Finland

The Mental Health Act states that the underaged patient may not be left alone while secluded/restrained (Revised Mental Health Act 1423/2001, 22f§). The practice has been implemented in most Finnish adolescent units using mechanical restraint, which allows the nurse to sit beside the hospital bed and care for the patient. According to the Mental Health Act, an adolescent may be mechanically restrained if s/he is in involuntary treatment or under observation and would, on account of her or his behaviour or threats, probably harm her/himself or others. The intervention is not allowed to continue any longer than is necessary (Revised Mental Health Act 1423/2001, 22e§). Psychiatric wards are obligated to report all mechanical restraint episodes to the Administrative District Court fortnightly.

2.2.2. Characteristics of mechanically restrained adolescents

Little is known about the frequency and epidemiology of the use of mechanical restraint in adolescent psychiatric in-patient care, possibly because adolescent psychiatry is not

an independent medical speciality in most of the countries, so there is a lack of research on adolescent psychiatry as a whole. In a Finnish nation-wide study by Sourander et al. (2002), the data comprised all admissions of children and adolescents who were inpatients on a particular day in January 2000. Out of 504 under-aged in-patients with age range from 2 to 18 years, 4% had experienced mechanical restraint procedure during the treatment period. In another Finnish study by Khenissi et al. (2004), 16 (15.1%) out of 106 13-18-year-old adolescents sent to involuntary psychiatric treatment experienced mechanical restraint. It is not possible to make any direct comparisons as both the legislation and the psychiatric practices vary greatly across countries, but according to a North-American study by Donovan et al. (2003), among 5- to 18-year-old in-patients, the two-year prevalence of the use of restraint was 49%.

Children and adolescents admitted to psychiatric hospital on an emergency basis and those belonging to ethnic minority groups have been described to be more likely to undergo restraint (Donovan et al. 2003). Use of mechanical restraint has also been associated with aggressive and suicidal behaviour, low general functioning, out-of-home placement, psychosis and long hospital stay (Sourander et al. 2002). Other characteristics of adolescents most likely to be restrained include being male, being in special education (Delaney & Fogg 2005), suffering from mental retardation, developmental disability, conduct disorder and other disruptive behaviour disorders as well as having histories of both violent behaviour and suicide attempts (Fryer et al. 2004).

2.3. Attitudes towards containment measures

2.3.1. Staff's attitudes towards various containment measures

In adult psychiatry, there are some studies all using the same instrument in order to investigate and to compare staff's attitudes towards eleven specific containment methods in different European countries (see Appendix, page 69) (Bowers et al. 2004, Bowers et al. 2007, Whittington et al. 2009). In general, staff in Finland has expressed the highest level of approval of containment; staff in the UK the least, with those in the Netherlands in-between. This finding has been explained by high rates of involuntary treatment and legal detention in the Finnish psychiatric system. Preferences for different containment measures seemed to be largely determined by whether the specific method was considered safe for the patients, to prevent patients from injuring others, and to calm the patients quickly (Bowers et al. 2007). So far, there are no published scientific reports studying the attitudes of staff working in the field of adolescent psychiatry.

2.3.2. Staff's attitudes towards mechanical restraint

Internationally, staff's perceptions of mechanical restraint vary widely. According to the above-mentioned containment study by Bowers et al. (2007), mechanical restraint was rated as the second most unacceptable containment method after net bed in both the UK and in the Netherlands. In Finnish adult psychiatry, mechanical restraint was rated much

higher and it was placed sixth after transfer to a specialist locked ward for disturbed patients, as-needed medication, intermittent observation, seclusion and continuous observation. It has been reported that unfamiliar containment measures tend to be rejected, whereas familiar ones tend to be supported (Exworthy et al. 2001, Holt 2004, van Doeselaar et al. 2008, Whittington et al. 2009). This phenomenon most probably also explains the results of international comparisons.

In the UK mechanical restraint has never been used. In the Netherlands mechanical restraint is used, but seclusion dominates clinical practice. In Finland seclusion is used more than mechanical restraint, but there are regional variations (Korkeila et al. 2002), and overall the frequency of mechanical restraint is much higher than in the Netherlands (the number of mechanically restrained adults per 100 000 inhabitants in the Netherlands was 12.6 and in Finland 38.7 [Steinert et al. 2010]). In general, male as well as younger staff have shown higher levels of approval of mechanical restraint than female and older staff (Whittington et al. 2009).

2.3.3. Patients' attitudes towards various containment measures

Recently, Whittington et al. (2009) reported the views of as many as 1361 adult psychiatric patients. Of the eleven different containment measures introduced in the Appendix (page 69), the patients approved most of intermittent observation, time out and as-needed medication and approved least of net bed, mechanical restraint and compulsory intramuscular medication. Older patients viewed the coercive measures more positively than younger ones.

In a study by Kazdin (1984) three different coercive interventions (medication, time out and seclusion) were rated by child in-patients. The children viewed medication as the most acceptable method followed by time out and seclusion. However, in a study by Tsemberis and Sullivan (1988) among children, seclusion was preferred over medication and the straitjacket, and medication over the straitjacket.

2.3.4. Patients' experiences of seclusion/ mechanical restraint

There are a variety of studies on adult patients' experiences and suggestions regarding seclusion and restraint practices. Some patients' experiences were negative, harmful or even traumatic (Bonner et al. 2002, Frueh et al. 2005, Huckshorn 2006, Kontio et al. 2012). Many patients did not know the reason for the intervention (Meehan et al. 2004) and experienced seclusion/mechanical restraint as a punishment (Holmes et al. 2004, Meehan et al. 2004, Keski-Valkama et al. 2010b) or as a violation of their autonomy (Hoekstra et al. 2004) or even as torture (Veltkamp et al. 2008). Some patients reported that the time spent in seclusion/ mechanical restraint was long, boring and distressful (Frueh et al. 2005, Keski-Valkama et al. 2010b, Kontio et al. 2012). The opinions of mechanically restrained patients tend to be more negative than the opinions of secluded patients (Wynn 2004). Seclusion and restraint-related negative emotions often mentioned

by adults were anger, confusion, loneliness, desolation as well as humiliation (Hoekstra et al. 2004). However, some patients were able to see the rationale behind the use of seclusion/mechanical restraint and considered them an integral part of hospital care (Vartiainen et al. 1995, Repo-Tiihonen et al. 2004, Kuosmanen et al. 2007). Also, positive experiences such as feelings of safety, security or calm were mentioned (Meehan et al. 2000, Kjellin et al. 2004). Overall, approval ratings by male patients have been shown to be higher than those by female service users for both seclusion and mechanical restraint (Whittington et al. 2009).

Adult patients' suggestions for improving seclusion and restraint practices were associated with poor interaction with staff, lack of activities, compulsory medication and dismal environment (Meehan et al. 2000, Kuosmanen et al. 2006, Keski-Valkama et al. 2010b). Adult patients expressed a need for more interaction with staff members and they also wanted staff to respect their autonomy as much as possible in the process of seclusion and mechanical restraint (Olofsson & Nordberg 2001, Holmes et al. 2004, Moran et al. 2009, Kontio et al. 2012). Patients also provided practical suggestions on how to improve the use of seclusion/mechanical restraint: the option to use toilet facilities and take care of hygiene, more comfortable bed as well as more therapeutic furnishing were all mentioned (Keski-Valkama et al. 2010b). They also expressed a need to discuss the seclusion/mechanical restraint episode and their feelings related to this intervention afterwards (Ryan & Happell 2009, Keski-Valkama et al. 2010b, Needham & Sands 2010).

Data on under-aged patients' experiences of seclusion is extremely scarce. Martinez et al. (1999) interviewed secluded children and adolescents and most of them described feeling neglected, fearful, vulnerable, worthless, bad, punished as well as without control in the seclusion room. Miller (1986) reported the same kind of finding using drawing techniques. The experiences of mechanically restrained children and adolescents have not been published.

2.4. Summary of the literature

Adolescence is a period of life when an individual transfers from childhood and his/her biological, cognitive, psychological and social characteristics become more adult-like. Adolescence is a risk period for the emergence of many psychiatric disorders and the incidence of psychiatric disorders increases from childhood through mid-adolescence and peaks in late adolescence and young adulthood. One of the key developmental tasks of all adolescents - both healthy and disturbed - is the establishment of personal independence and autonomy. This makes containment, as such, an important area to study at this particular age. Nevertheless, there are only few studies focusing on under-aged patients' opinions and experiences of various containment measures used in the field of psychiatry. All these few studies have been conducted among child, not adolescent inpatients. Regarding staff, there are few studies investigating the attitudes

towards a variety of specific containment methods in the field of adult psychiatry, but the perspectives of adolescent psychiatry are still lacking.

Mechanical restraint, i.e. confining the patient to bed using belts, is probably the most powerful restriction of personal liberty used in Finnish adolescent psychiatric nursing and as such a matter of great importance. Unfortunately, there are so far no scientific publications focusing on this issue. According to the American Academy of Child and Adolescent Psychiatry guidelines, mechanical restraint is clearly an intervention of last resort and the use of it should always be limited to situations when prevention strategies are ineffective and an adolescent is in danger of hurting him/herself or others.

The Mental Health Act in Finland states that the underage patient may not be left alone while secluded/restrained. The practice has been implemented in most Finnish adolescent units using mechanical restraint and allowing the nurse to sit beside the hospital bed and care for the patient. Psychiatric wards are obligated to report all mechanical restraint episodes to the Administrative District Court fortnightly, but the reports have not been analyzed systematically. Because of this, little is known about the frequency of the use of mechanical restraint in Finnish adolescent psychiatric in-patient care. According to the Finnish Mental Health Act, mechanical restraint is not allowed to continue any longer as is necessary. However, in Finnish adult psychiatry, the long duration of the intervention has been repeatedly one of the reasons why many patients have even regarded mechanical restraint as punishment. The situation in adolescent psychiatry has not yet been investigated.

In Finland, a special programme has been designed by the Ministry of Social Affairs and Health in order to reduce the use of both seclusion and mechanical restraint by as much as 40% by 2015. This is to be carried out by creating new practices as well as by changing attitudes. Unfortunately, deep-rooted treatment traditions and attitudes have proven difficult to change. This is one of the reasons – according to the new Health Care Act (1326/2010) in Finland - why the importance of the patient's perspective in the development of in-patient aggression management programmes has been clearly recognized. The perspective of young patients must also be known in order to develop mechanical restraint practices in Finnish adolescent psychiatry.

3 AIMS OF THE STUDY

The overall goal of the study was to describe and enhance the knowledge of the use of containment measures, especially mechanical restraint, in the inpatient psychiatric treatment of adolescents. The study adopted the following four sub-goals:

1. To investigate staff's attitudes towards various containment measures in the inpatient psychiatric treatment of adolescents (Phase I, Paper I)
2. To investigate adolescent in-patients' attitudes towards various containment measures compared to those of the staff (Phase II, Paper II)
3. To investigate the frequency and features of mechanical restraint in the inpatient psychiatric treatment of adolescents (Phase III, Paper III)
4. To study the experiences of mechanically restrained adolescent in-patients (Phase IV, Paper IV)

More specifically, the following phases and research questions of this study were:

Phase I: Attitudes towards different containment measures: a questionnaire survey in Finnish adolescent psychiatry

1. What kind of attitudes towards various containment measures do the staff working in adolescent psychiatric inpatient wards have? (Paper I)
2. Do the attitudes of nurses and doctors differ from each other? (Paper I)
3. Is age related to nurses' and doctors' attitudes? (Paper I)
4. Is working experience related to nurses' and doctors' attitudes? (Paper I)

Phase II: Underaged Patients' Opinions Toward Different Containment Measures: A Questionnaire Survey in Finnish Adolescent Psychiatry

1. What kind of attitudes towards various containment measures do adolescent girls and boys referred to inpatient wards have? (Paper II)
2. Do the attitudes of the adolescents differ from those of the staff? (Paper II)

Phase III: Mechanical restraint in adolescent psychiatry: a Finnish Register study

1. How frequent is the use of mechanical restraint in Finnish adolescent psychiatry? (Paper III)
2. What are the main reasons for the use of mechanical restraint? (Paper III)

3. How long do the episodes of mechanical restraint last? (Paper III)
4. What kind of adolescent patients are restrained? (Paper III)

Phase IV: Adolescent in-patients' view of mechanical restraint: a Finnish interview study

1. Do the adolescents know the reasons for their mechanical restraint? (Paper IV)
2. Do the self-perceived reasons correspond to those recorded in the patients files? (Paper IV)
3. Do the adolescents regard their mechanical restraint as a positive or negative measure, or are they able to see both aspects? (Paper IV)
4. How do the adolescents perceive the interaction between themselves and the staff during and after the mechanical restraint? (Paper IV)
5. Can the adolescents offer suggestions for improving the present use of mechanical restraint? (Paper IV)

The following hypotheses were addressed:

1. The staff working with underage patients regard containment methods with significant criticism.
2. The adolescent in-patients disapprove of most of the containment methods and they are much more critical than the staff.
3. The frequency of mechanical restraint is high and the duration of the mechanical restraint episodes are long.
4. Most mechanically restrained adolescents view mechanical restraint as a negative experience.

4 METHODOLOGY

4.1. Rationale of the methodological approaches

Restraint in adolescent psychiatry is a complex phenomenon. Restrictions are used in psychiatric treatment both to treat, help, or cure the patient, and to control her/him (Kaltiala-Heino et al. 2003) and different conditions apply to the use of them. In the present study, a mixed method approach was applied to better understand this complex phenomenon and to gain more insight into the topic (Bowling 2004, Moffatt et al. 2006, Driessnack et al. 2007, Burns & Grove 2009, Polit & Beck 2012).

To elicit staffs' and adolescent patients' attitudes towards various containment methods (Phases I and II), cross-sectional surveys were conducted. In order to compare the attitudes of the staff to those of the adolescents, the results from Phase I were supplemented in Phase II. To ascertain the current frequency as well as the characteristics of mechanical restraint, a register study was carried in Phase III. Finally, in Phase IV, an explorative study was conducted in order to elicit the experiences and opinions of the mechanically restrained adolescents. Different designs, data collection methods and data analysis achieved a more detailed picture of the phenomena studied. Table 1 describes the designs, methods of data collection and analysis of the study in detail.

Table 1. Phases, designs, methods of data collection and analysis of the study

	Phase I	Phase II	Phase III	Phase IV
Design	Cross-sectional survey	Cross-sectional survey	Register study	Explorative study
Data collection	Self-administered survey	Self-administered survey	Official restraint reports Patient records	Semi-structured interview
Data analysis	Descriptive statistics, Mann-Whitney U-test	Descriptive statistics, Mann-Whitney U-test	Descriptive statistics, Chi-square test, Fisher's exact test, Wilcoxon rank sum test, Independent sample t-test	Descriptive statistics

4.2. Study setting

The data were collected in the Hospital District of Helsinki and Uusimaa (HUS), which includes approximately 1.5 million inhabitants, of whom nearly 100,000 are 13-to 17-year olds. HUS comprises five hospital areas. The present study was conducted in two of these: HUCH Hospital Area and the Hospital Area of Hyvinkää. HUS has a total of seven (4 in

HUCH and 3 in the Hospital Area of Hyvinkää) (as of 2012 five) closed wards for Finnish-speaking 13- to 17-year-old adolescents. In 2009 the total number of hospital days in closed wards was 18 608, and the number of adolescents treated 493. The hospital district also has eight open wards for adolescent patients. In 2009, the total number of hospital days was 14 375 and the number of adolescents 187 in these open units (Annual Report of HUS 2009).

In 2011, HUS had altogether 21 322 employees of whom 11 878 were nursing staff and 2 683 doctors. In HUCH adolescent psychiatry, the number of nursing staff was 250 and the number of doctors 50. In the Hospital Area of Hyvinkää adolescent psychiatry, the number of nursing staff was 86 and the number of doctors 10 (Annual Report of personnel in HUS 2011).

In **Phase I** to study and describe the staffs' attitudes toward different containment measures, the data were collected from nurses (registered nurses, practical nurses in social and health care and practical psychiatric nurses) (Valvira 2012) and doctors (senior psychiatrists/adolescent psychiatrists and junior psychiatrists specializing in psychiatry/adolescent psychiatry) working on seven closed wards with Finnish-speaking adolescents. A person was excluded from the study if she/he had worked less than two weeks on the ward or had not worked a single day during the data collection period (annual leave, out of the office, maternity leave and sickness). The data were collected between October 2009 and March 2010. (Paper I.)

In **Phase II** to study and describe the adolescents' attitudes towards different containment measures, the data was collected from all 15- to 17-year old patients present on 15 adolescent wards (both open and closed) during the six-month study period from January to June 2011.(Paper II.)

In **Phase III** to study the frequency and features of mechanical restraint in Finnish adolescent psychiatry, the data were collected from the official restraint reports and patient records on seven adolescent closed wards (4 in HUCH and 3 in the Hospital Area of Hyvinkää) treating 13-17 year-old adolescents. The data were collected from January to December 2009. (Paper III.)

In **Phase IV** to study the experiences and opinions of mechanically restrained adolescent patients, the data was collected on six adolescent closed wards from January 2011 to June 2012. (Paper IV.)

4.3. Instruments

In **Phases I and II**, the attitudes towards various containment measures were surveyed using the Attitude to Containment Measures Questionnaire (ACMQ) developed by Bowers et al. (2004) (see Appendix). The self-administered questionnaire names, defines and illustrates 11 methods of containment, and asks the respondent to rate each method for acceptability, efficacy, safety for staff, safety for patients, dignity for patients and the respondent's willingness to use that method. Ratings are evaluated using a five-

point Likert scale (strongly disagree [1] – strongly agree [5]). The Finnish version was prepared using the iterative process of translation and independent backtranslation, followed by a discussion to resolve minor differences (for details, see Bowers et al. 2007). The staff's questionnaire included questions about the respondent's background (age, gender, education, profession, working experience). As background questions, age and gender were elicited from the adolescents. The respondents also had the option to write comments in their own words about each containment measure. (Paper I and II.)

In **Phase III** the variables collected from official restraint reports included the number of mechanical restraint episodes, the names and social security numbers of the mechanically restrained adolescents as well as the durations of the mechanical restraint episodes and the judicial reasons for these. The variables from the medical records of the mechanically restrained adolescents included age, gender and psychiatric disorders based on ICD-10 classification (WHO 1992), the legal status of the patient right before the intervention (voluntary treatment [= the patient was put under observation in the same time as she/he was mechanically restrained] / under observation [= the patient was under observation already before she/he was mechanically restrained] / involuntary treatment), the length of the hospitalization before the first episode of mechanical restraint as well as psychiatric medications before, during and after the first mechanical restraint episode. Based on the narrative texts of the patient records, the global functioning of the patient was assessed by one of the researchers (A.H.), after round table discussion with senior researcher, using the Children's Global Assessment Scale (C-GAS) (Shaffer et al. 1983). The C-GAS (numeric scale 1-100) is designed to reflect the level of functioning of a child or an adolescent in a specified time period. Suicidal ideation defined as wishes, thoughts, threats and desires to take one's own life violently (O'Carroll et al. 1996), actual suicide attempts, violent behaviour and threats of violence during the hospital treatment and earlier in life were evaluated retrospectively. (Paper III.)

In **Phase IV**, the mechanically restrained adolescents were interviewed using a semi-structured interview modified from the questions presented in a study by Keski-Valkama et al. (2010b) (see Appendix). Structured questions regarding beneficial, harmful, punitive and necessary aspects of restraint were followed by open ended questions. There were also structured questions about positive/negative experience, opportunity to discuss with staff as sufficient or insufficient and alternatives instead of or before mechanical restraint. The self-reported reasons for the index mechanical restraint episodes as well as improvements regarding the present use of restraint were elicited by means of an open-ended question. Background data on the adolescents interviewed were collected from their hospital files and official restraint reports. Gender, age, the number of mechanical restraint episodes prior to the index episode, the duration of the index mechanical restraint episode and the primary ICD-10 diagnoses (WHO 1992) of the treatment period were collected. The reason for the index mechanical restraint episode, as recorded in the patient files, was classified into five categories (actual violence, threats of violence, damaging/threatening damage of property, agitation, disorientation, unclassified) using a classification presented by Kaltiala-Heino et al. (2003). (Paper IV.)

4.4. Data collection

In **Phase I**, to start the survey, information sessions were organized for the head nurses, ward managers and senior doctors in order to introduce the study protocol. The questionnaires with cover letters and return envelopes were delivered to the nursing staff on the wards during unit meetings or via mailboxes if personal contact was impossible. The completed questionnaires were returned to the researchers via ward managers. As doctors did not attend the unit meetings, they received the same material by post and also returned their completed questionnaires by post. (Paper I.)

In **Phase II**, to start the survey, information sessions were organized for the head nurses, ward managers and nurses, and senior doctors by A.H. in order to introduce the study protocol. A.H. delivered the questionnaires with cover letters and return envelopes to the nursing manager in the wards during unit meetings. The patient's nurse in charge evaluated whether the patient was coherent and emotionally stable enough to give informed consent and to fill in the questionnaire. The adolescents returned the questionnaires in sealed envelopes to the ward manager, who returned them to the researcher. (Paper II.)

In **Phase III**, to start the register study, all the official restraint reports of all seven adolescent wards were collected from the 1st of January 2009 to the 31st of December 2009. (Paper III.)

In **Phase IV**, to start the interview study, information sessions were organized for the head nurses, ward managers and nurses, and senior doctors in order to introduce the study protocol. The patient's nurse in charge evaluated whether the patient was coherent and emotionally stable enough to give informed consent and to participate the interview. (Paper IV.)

4.5. Study sample

In **Phase I**, on the closed wards, there were altogether 179 staff members, out of 129 (72.1%) who filled in the questionnaire. Of these, one (0.8%) had to be excluded due to the nursing student status of the respondent. The final number of respondents was 128 (see Figure 1.). Of the respondents, 95 were women and 33 were men; 96 were nurses and 32 were doctors. (Paper I.)

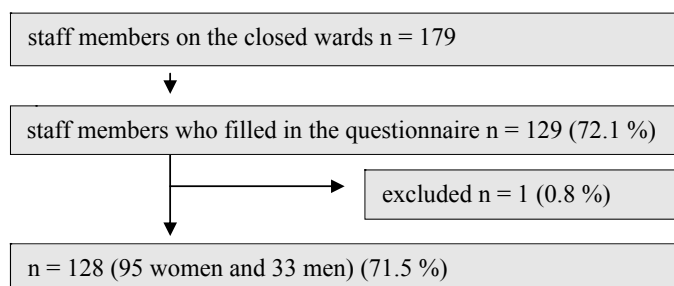


Figure 1. Data collection in Phase I

In **Phase II**, out of 233 15- to 17-year old in-patients treated on the study wards, 81 (34.8%) adolescents (58 girls and 23 boys) with a mean age of 16.3 years (SD 0.79) filled in the questionnaire. (Paper II.)

In **Phase III**, 47 mechanically restrained 15- to 17-year old adolescents (35 girls and 12 boys) with altogether 161 mechanical restraint episodes were identified from the hospital registers during one year. (Paper III.)

In **Phase IV**, altogether 30 patients aged 15 to 17 were mechanically restrained. Of these, four adolescents (13.3%) did not meet the inclusion criteria and seven (23.3%) were not invited to participate due to the negligence of the personnel. Of the remaining 19 adolescents, four (21.1%) declined to participate. Finally, the study population comprised 15 adolescents (14 girls and 1 boy) (see Figure 2.). The mean age of the adolescents interviewed was 16.0 years (SD 0.85). The main diagnosis was schizophrenia-related in six cases, behavioural and emotional disorder in five cases and mood disorder in four cases. The duration of the index mechanical restraint episodes ranged from 90 minutes to 2888 minutes with a median duration of 1075 minutes. The mean number of mechanical restraint episodes before the index one was 1.8 (SD 3.65) ranging from 0 to 14 median being 0. The time elapsing between the index mechanical restraint episode and the interview was 9.13 days (SD 7.44) ranging from 1 to 24 days, median 6 days. The reason for the index mechanical restraint was actual violence in 14 cases and threats of violence in one case. (Paper IV.)

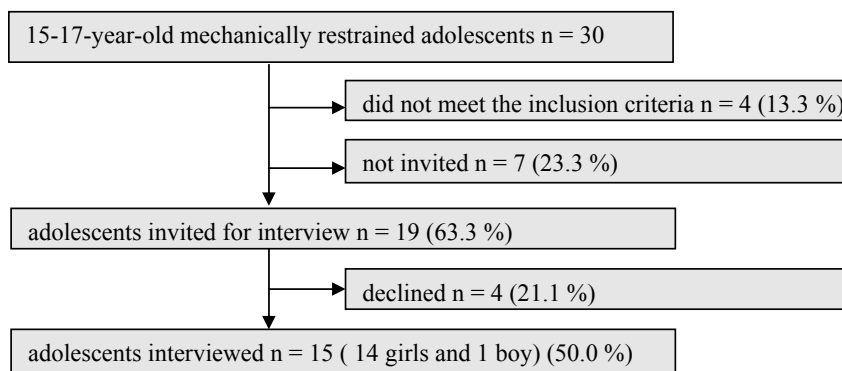


Figure 2. Data collection in Phase IV

4.6. Data analyses

In **Phase I**, ratings of overall approval for each containment method were obtained by adding each individual's ratings of its efficacy, acceptability, safety for staff, safety for patients, dignity for patients and staff willingness to use, thus producing a total of 11 method-specific scores. For each containment method, specific rates for all six variables (acceptability, efficacy, safety for staff, safety for patient, dignity for patients, willingness to use) were also counted by combining each individual's ratings for them. SPSS 17

was used for statistical analyses. Because the data were unequally distributed, the comparisons between the groups were tested with the Mann-Whitney U-test. Findings were considered significant when $p < 0.05$. (Paper I.)

In **Phase II**, ratings of overall approval were obtained for each of the eleven containment methods in accordance with earlier studies (Bowers et al. 2004, Bowers et al. 2007). Each individual rated the method for a) acceptability, b) efficacy, c) safety for staff, d) safety for patients, e) dignity for patients, and f) staff willingness to use, to give 11 method-specific scores that were summed to yield an overall approval rating. SPSS 17 was used for statistical analysis. Since the data was not equally distributed the comparisons between the groups were tested with Mann-Whitney U-test. Findings were considered significant when $p < 0.05$. (Paper II.)

In **Phase III**, data analyses were conducted with SPSS 11.0.1 and SAS 9.1 statistical software packages. Likelihood ratio Chi-square test and Fishers's Exact Test were used to compare the groups. The magnitudes of effect size phi were interpreted as follows: 0.00 to under 0.10 - negligible association, 0.10 to under 0.20 – weak association, 0.20 to under 0.40 - moderate association, 0.40 to under 0.60 – relatively strong association, 0.60 to under 0.80 – strong association, and 0.80 to 1.00 – very strong association (Rea and Parker, 1992). Comparisons in duration of mechanical restraint as well as number of restraint episodes were assessed using Wilcoxon's rank sum test. Age and C-GAS scores were compared using Independent Sample T-test. Findings were considered significant when $p < 0.05$. (Paper III.)

In **Phase IV** the study was descriptive. (Paper IV).

4.7. Ethical issues

The study plan was evaluated by the ethics committee in Helsinki and Uusimaa Hospital Districts. Permission to conduct the study was granted by the pertinent institutional authorities at Helsinki University Central Hospital and Hyvinkää Hospital Area.

The staff members and adolescents could decline to participate in the study phases. The researcher was the only one to get, use and keep the confidential information on the study members (Personal Data Act 1999/523, Act on the Openness of Government Activities 1999/621). The researcher respected the privacy of the study members by not divulging their situations to a third party and by changing the information into nonidentifiable form. The researcher informed those concerned by written and oral information on study phases I, II and IV. The study benefitted the adolescents as they could express their opinions on containment measures and mechanical restraints. This helps to develop these measures in a more humane direction. Without their opinions, it would not have been possible to understand the adolescents as well in these situations. Before the study, it was planned the actions, if an adolescent would have needed help during/after research process. (Vilka 2007, Davidson & O'Brien 2009.)

It is the duty of a researcher to protect the life, health, dignity, integrity, right to self-determination, privacy and confidentiality of personal information of research subjects. The design and performance of each research phase in this study were clearly described in a research protocol. The protocol contained a statement of the ethical considerations involved and included information regarding funding and other potential conflicts of interest. The research protocols were submitted for consideration, comment, guidance and approval to a research ethics committee before the study began. No change to the protocol was made without consideration and approval by the committee. Medical research involving human subjects was conducted by a doctoral student who had the appropriate scientific training to conduct the study with the help of her supervisors. (Goodyear et al. 2007, Davidson & O'Brien 2009, European Union 2001.)

Consent to participate was expressed and could be withdrawn by the person concerned at any time and for any reason without disadvantage or prejudice. In accordance with the universal declaration, special protection was given to persons who did not have the capacity to consent. Individuals with special vulnerability – adolescents - were protected and their personal integrity of them was respected. (Ensign 2003, Universal Declaration on Bioethics and Human Rights 2005.)

In **Phase I**, the researcher informed the respondents of their rights in the study in an oral presentation and/or cover letter. The participants were assured of the confidentiality and anonymity regarding the data, and that participation in the study was voluntary. Return of the completed questionnaires from the participants was taken as confirmation of their consent. Privacy was ensured by having no identifying factors in the questionnaires and return envelopes. (Paper I.)

In **Phase II**, written informed consent was obtained from all participants after they had received oral and written information about the study. The participants were assured of confidentiality and anonymity regarding the data. Privacy was ensured by having no identifying factors in the questionnaires and return envelopes. A letter was sent to the guardians of the patients to inform them about the study and they had the opportunity to see the questionnaire. (Paper II.)

In **Phase IV**, written informed consent was obtained from all participants after they had received oral and written information about the study. The staff evaluated if the mechanically restrained adolescent was coherent and stable enough to understand the content of informed consent and to be interviewed. A letter was sent to the guardians of the patients to inform them about the study and they had the opportunity to see the questions asked in the interview. The adolescents were informed that participation or refusal to participate or their responses to the questions would have no impact on their treatment on the ward. (Paper IV.)

All data papers (**Phases I-IV**, Papers I-IV) were kept in locked cupboard in the offices of HUCH adolescent psychiatry. The data (without the names and identity codes of the

adolescents [Phases III and IV, Papers III and IV]) were transferred to electronic files as soon as possible after the collection of the data. The memory stick containing the research data was kept in a locked cupboard in the offices of HUCH adolescent psychiatry.

5 RESULTS

5.1. Attitudes towards various containment measures

5.1.1. Staff's attitudes towards various containment measures

In general, staff working in adolescent psychiatric closed wards in HUS expressed high levels of approval of all 11 containment measures. Mechanical restraint was reported to be the most effective containment method. IM (intramuscular) medication received the highest rates of acceptability. As-needed medication was considered to be the most dignified and safest method. However, the staff was mostly prepared to use PICU (Psychiatric intensive care unit) (transfer to a specialist ward for disturbed patients; see Appendix I, page 75). Focusing on overall approval scores, as-needed medication, transfer to specialist locked wards and mechanical restraint were the three most approved methods. The least approved method was the net bed (for details, see Table 2). (Paper I.)

When the total approval scores of different containment methods were compared between the nurses and the doctors, the results were very similar (for details, see Table 2.), but the doctors reported significantly less approval regarding mechanical restraint (nurses: mean 26.11 [SD 3.28] vs. doctors: mean 23.88 [SD 2.90], $U= 873.0$, $p < 0.001$) and constant observation (nurses: mean 21.94 [SD 2.67] vs. doctors: mean 20.16 [SD 2.99], $U= 1010.0$, $p < 0.001$) compared to nurses. (Paper I.)

The background information partly explained the results. Men showed a tendency to greater approval of all types of containment methods with the sole exception of open area seclusion, but statistically significant differences were observed only in attitudes towards IM medication (men: 25.50 [SD 3.57] vs. women: mean 23.11 [SD 4.38], $U= 1005.0$, $p= 0.01$) and mechanical restraint (men: 26.61 [SD 3.12] vs. women 25.19 [SD 3.33], $U= 1155.5$, $p = 0.02$). (Paper I.)

The total approval scores of the staff aged 29 years or less ($n=25$) were compared with those of the staff aged 50 years or more ($n=22$). A significant difference was observed in attitudes towards the net bed the younger ones being more positive towards the intervention (older group: mean 14.91 [SD 4.84] vs. younger group: mean 17.92 [SD 3.09], $U= 139.5$, $p= 0.006$). (Paper I.)

The total approval scores of the staff with work experience of ten years or more ($n=59$) were compared with those whose work experience was only three years or less ($n=25$). No statistical differences were found in overall approval scores between the groups. (Paper I.)

Table 2. Total approval scores of eleven containment methods in the Attitude to Containment Measures Questionnaire (ACMQ) among 81 adolescent patients (58 girls and 23 boys) and 128 staff members (95 women and 33 men; 96 nurses and 32 doctors)

	Patients		Staff		Nurses		Doctors	
	mean	SD	mean	SD	mean	SD	mean	SD
As-needed medication	24.8	4.39	26.6	4.22	26.4	4.16	27.0	4.49
Physical restraint	18.7	5.00	24.7	4.23	24.8	4.35	24.5	3.89
Intermittent observation	23.3	5.40	24.8	4.65	24.8	4.64	24.8	4.75
Seclusion	18.2	5.17	21.5	5.63	21.3	5.86	22.3	4.87
Time out	22.0	5.64	25.2	3.92	25.3	3.92	24.8	3.96
IM medication	17.7	5.03	23.7	4.30	23.8	4.49	23.1	3.71
PICU	21.2	5.14	26.5	3.08	26.5	3.16	26.3	2.88
Mechanical restraint	17.7	5.49	25.6	3.32	26.1	3.28	20.2	2.99
Constant observation	19.4	6.42	21.5	2.85	21.9	2.67	20.2	2.99
Net bed	14.3	4.55	15.4	4.49	15.5	4.73	15.3	3.77
Open area seclusion	19.6	6.05	22.1	4.83	21.9	4.82	22.7	4.91

5.1.2. Adolescents' attitudes towards various containment measures

As-needed medication, intermittent observation and time out were the methods with the highest total approval scores. Out of 81 adolescents, 37 wrote comments in their own words about about as-needed medication. They considered it a helpful (27%), safe (8%) and respectful (5%). Time out was commented by 27 out of 81 adolescents: the method was considered suitable (30%), helpful (22%) and respectful (15%). The three least approved methods were net bed, mechanical restraint, and IM medication. Out of 81 adolescents 33 wrote comments in their own words about the net bed, which was described an inhumane (36%), distressing (21%) and cruel (12%) method. Mechanical restraint was commented by 28 out of 81 adolescents: this method was considered distressing (21%), inhumane (14%) and cruel (14%). However, eight patients, who had experienced mechanical restraint, viewed the method more positively than the rest (experienced: mean 22.3 [SD 5.5] vs. not experienced: mean 17.2 [SD 3.6], $U=128.5$, $p=0.01$). Out of 81 adolescents 35 wrote comments in their own words about intramuscular medication, which was considered inhumane (20%) and cruel (17%). (For details, see Table 2). The patients did not always know whether they had experienced containment methods or not. For intermittent observation, four adolescents suspected that they had received it, but they were not certain. (Paper II.)

In general, adolescents were more critical of all 11 containment measures than were the staff (as-needed medication: adolescents: mean 24.8 [SD 4.39] vs. staff: mean 26.6 [SD 4.22], $U=3791.5$, $p<0.001$; physical restraint: adolescents: mean 18.7 [SD 5.00] vs. staff: mean 24.7 [SD 4.23], $U=1707.5$, $p<0.001$; intermittent observation: adolescents: mean 24.8 [SD 4.39] vs. staff: mean 26.6 [SD 4.22], $U=3791.5$, $p<0.03$; seclusion: adolescents: mean 18.2 [SD 5.17] vs. staff: mean 21.5 [SD 5.63], $U=$

3214.5, $p < 0.001$; time out: adolescents: mean 22.0 [SD 5.64] vs. staff: mean 25.2 [SD 3.92], $U = 3244.5$, $p < 0.001$; IM medication: adolescents: mean 17.7 [SD 5.03] vs. staff: mean 23.7 [SD 4.30], $U = 1843.0$, $p < 0.001$; PICU: adolescents: mean 21.2 [SD 5.14] vs. staff: mean 26.5 [SD 3.08], $U = 1942.0$, $p < 0.001$; mechanical restraint: adolescents: mean 17.7 [SD 5.49] vs. staff: mean 25.6 [SD 3.32], $U = 1200.0$, $p < 0.001$; open area seclusion: adolescents: mean 19.6 [SD 6.05] vs. staff: mean 22.1 [SD 4.83], $U = 3882.5$, $p = 0.04$). However, the difference was not statistically significant for the net bed and constant observation. Attitudes towards mechanical restraint differed noticeably among adolescents and staff. The adolescent patients estimated mechanical restraint among the three least acceptable methods, the staff among the three most acceptable containment methods. (Paper II.)

5.2. Frequency and features of mechanical restraint

Altogether 493 adolescents (314 girls and 179 boys) were treated in seven closed wards (4 closed units in HUCH and 3 closed units in the Hospital Area of Hyvinkää) during the one-year study period. Of these 493 adolescents, 47 (9.5%; 35 girls and 12 boys) were mechanically restrained during their treatment period. Of all adolescent in-patients during the study period (493 above-mentioned persons treated in closed wards and 187 adolescents treated in eight open wards), 6.9% of the adolescents were mechanically restrained. The number of mechanically restrained individuals per 100 000 13 to 17-year-old Finnish-speaking inhabitants was 57.1. (Paper III.)

There were altogether 161 mechanical restraint episodes during the study year. The number of restraint episodes varied between 1 and 26 among the mechanically restrained adolescents with a median of 3 episodes. The number of restraint episodes was higher among the girls than the boys (girls: median 3, range 1-26, vs. boys: median 1, range 1-8; Wilcoxon signed rank test, $p = 0.03$). The mechanical restraint episodes lasted from 15 minutes to over 2 400 minutes (40 hours), the median duration being 290 minutes (4 hours 50 minutes). There was no statistically significant gender difference in the duration of the mechanical restraint episodes. Of which 46% lasted 8 hours or more and 25% lasted 13 hours or more. (Paper III.)

The main reasons for mechanical restraint episodes were harming/threat of harming oneself (50%), harming/threat of harming others (25%) and other reasons (25%). The boys were more often mechanically restrained for other reasons (boys: 11/25 vs. girls: 29/136, $X^2 = 16.8$, $p < 0.001$, $\Phi = 0.32$). The primary ICD-10 diagnoses of the mechanically restrained adolescents can be seen in Table 4. Boys suffered notably more often from behavioural and emotional disorders than did the girls (boys: 6/12 vs. girls: 1/35, Wilcoxon Rank Sum Test, $p < 0.001$, $\Phi = 0.58$). (Paper III.)

The frequencies of suicidal ideation, behaviour or threats, suicide attempts, verbal threats of physical aggression as well as physical aggression prior to mechanical restraint episodes can be seen in Table 3. The boys more often expressed violent threats (boys:

15/25 vs. girls: 36/136, $X^2= 11.0$, $p< 0.001$, $\Phi= 0.26$) as well as violent behaviour prior to the mechanical restraint episodes (boys: 13/25 vs. girls: 24/136, $X^2= 7.45$, $p=0.006$, $\Phi= 0.22$). The boys also more often had a history of violent behaviour earlier in life than did the girls (boys: 7/12 vs. girls: 4/35, Wilcoxon Rank Sum Test, $p = 0.003$, $\Phi= 0.48$). The boys also more often had a history of violent behaviour earlier in life than did the girls (boys: 7/12 vs. girls: 4/35, Wilcoxon Rank Sum Test, $p = 0.003$, $\Phi= 0.48$). No gender differences emerged in suicidality prior to the mechanical restraint episodes or in the histories of suicidal behaviour earlier in life. The mean C-GAS score of the mechanically restrained adolescents was 32.3 (SD 6.9). No gender differences emerged. (Paper III.)

The duration of hospitalization prior to the first episode of mechanical restraint can be seen in Table 3. The boys were mechanically restrained at the beginning of their hospital treatment significantly more often than the girls (boys: 8/12 vs. girls: 4/35, Wilcoxon Rank Sum Test, $p< 0.001$, $\Phi= 0.57$). Of girls, 23% experienced their first restraint episode one month after admission. No gender difference was observed in hospital treatment periods of mechanically restrained adolescents. Medication prior to, during and after the first episode of mechanical restraint can be seen in Table 3. Benzodiatsepines were initiated or increased after the first episode of mechanical restraint significantly more often among the boys than girls (boys: 6/12 vs. girls: 3/35 Wilcoxon Rank Sum Test, $p = 0.005$, $\Phi= 0.46$). (Paper III.)

Table 3. Primary ICD-10 diagnoses, suicidality, aggressive behaviour and medication of 47 mechanically restrained adolescents with altogether 161 mechanical restraint episodes from the 1st of January 2009 to the 31st of December 2009

	n	%
<i>ICD-10 diagnoses</i>		
F30-39 mood disorders	21	44.7
• bipolar disorder	3	6.4
• psychotic depression	4	8.5
• severe depression	4	8.5
• moderate depression	10	21.3
F20-29 schizophrenia, schizotypal and delusional disorders	10	21.3
F90-98 behavioural and emotional disorders	7	14.9
F50-59 behavioural syndromes associated with physiological disturbances and physical factors	4	8.5
F40-49 stress-related and somatoform disorders	2	4.3
F00-09 organic, including symptomatic mental disorders	1	2.1
F10-19 mental and behavioural disorders due to psychoactive substance abuse	1	2.1
F60-69 disorders of adult personality and behaviour	1	2.1
<i>Suicidal ideation, behaviour or threats prior to mechanical restraint episode</i>	63	39.6
<i>Suicide attempt prior to mechanical restraint episode</i>	6	3.8
<i>Verbal threats of physical aggression prior to mechanical restraint episode</i>	51	31.7

	n	%
<i>Physical aggression prior to mechanical restraint episode</i>	47	29.2
<i>Legal status of the patient prior to the first episode of mechanical restraint</i>		
Voluntary treatment (the patient was put under observation while mechanically restrained)	20	42.6
Under observation (the patient was under observation already before the mechanical restraint episode)	11	23.4
Involuntary treatment	16	34.0
<i>Length of hospitalisation prior to first episode of mechanical restraint</i>		
< 5 days	12	25.5
5-30 days	27	57.4
>30 days	8	17.0
<i>Medication prior to first episode of mechanical restraint</i>		
Antipsychotic medication	34	72.3
Benzodiatsepines	29	61.7
As-needed medication	14	29.8
<i>Medication during first mechanical restraint episode</i>		
IM medication	4	8.5
<i>Medication after first episode of mechanical restraint</i>		
Initiated or increased dosage of antipsychotic medication	14	29.8
Initiated or increased dosage of benzodiatsepines	9	19.1

5.3. Adolescents' experiences and opinions of mechanical restraint

All adolescents interviewed gave a reason for their index mechanical restraint episode, and in most cases the reason was in line with the reason found in the medical records. Most of the adolescents regarded mechanical restraint with ambivalence, observing both its beneficial and harmful effects. Most of the adolescents also regarded mechanical restraint as punishment. Four out of 15 adolescents felt that interaction with the staff during mechanical restraint was insufficient. Two of them reported that interaction was not sufficient, felt that the nurse in charge in the restraint room was too busy working with his/her laptop/mobile phone. Only three patients had received a debriefing afterwards. Seven out of twelve adolescents who had not received a debriefing denied that they would have needed it. Most of them suggested alternative methods to the use of mechanical restraint. However, mechanical restraint was seen as a necessary measure in psychiatric nursing. The adolescents articulated numerous ideas on how to improve the use of mechanical restraint. The results are expressed in detail in Table 4. (Paper IV.)

Table 4. Experiences and opinions of mechanically restrained adolescents (n= 15)

	n	%
<i>Reason for mechanical restraint</i>		
Discrepancy between self-reported reasons for mechanical restraint and those recorded in the files	4/15	26.7
<i>Mechanical restraint as an at least partly beneficial measure</i>		
Protection from aggressive impulses	6/11	54.5
Feelings of safety	5/11	45.5
Opportunity to calm down	4/11	36.4
Interesting experience	2/11	18.2
An opportunity to discuss with nurses	1/11	9.1
<i>Mechanical restraint as an at least partly harmful measure</i>		
Excessively long mechanical restraint episode	12/14	85.7
Immobility	11/14	78.6
Physical pain	9/14	64.3
Lack of activities	4/14	28.6
A scary situation	4/14	28.6
Lack of privacy	3/14	21.4
Fear of re-mechanical restraint	3/14	21.4
Being under constant observation	3/14	21.4
Too little interaction with the staff	3/14	21.4
Intervention evoked memories of earlier domestic violence/sexual abuse	2/14	14.3
Personnel was too heavy-handed	2/14	14.3
<i>Mechanical restraint as a form of punishment</i>		
Loss of autonomy	7/9	77.8
Long duration of the mechanical restraint episode	7/9	77.8
Mechanical restraint was believed to be a consequence of “bad behaviour”	6/9	66.7
Undressing, urinating or defecating in the presence of nurses including those of the opposite sex	2/9	22.2
Use of bedpan	2/9	22.2
Not taken proper care of	1/9	11.1
An inhumane setting	1/9	11.1
<i>Suggested alternatives to the use of mechanical restraint</i>		
Medication	7/11	63.6
Activities	4/11	36.4
Rest in one’s room	3/11	27.3
Verbal de-escalation	3/11	27.3
A more thorough explanation of the ward rules	2/11	18.2
Option to exercise in gym	2/11	18.2
Option to go voluntarily to a “padded room”	2/11	18.2
Use of safety blanket	1/11	9.1
Time out	1/11	9.1
Constant observation	1/11	9.1
<i>Mechanical restraint a necessary measure in psychiatric hospitals</i>		
Justification: aggressive behaviour against others or oneself	7/9	77.8
Justification: inability to calm down	3/9	33.3

	n	%
<i>Suggested improvements in the use of mechanical restraint</i>	12/15	80.0
Shorten the mechanical restraint episodes	7/12	58.3
More active measures for evaluating the possibility of ending the ongoing intervention	7/12	58.3
More information about the intervention in advance	3/12	25.0
More interaction with personnel during the mechanical restraint episode	2/12	25.0
Opportunities to listen to music, read and draw	2/12	25.0
Opportunity to use the toilet and shower when needed	2/12	25.0
Privacy when changing clothes, urinating or defecating	2/12	25.0
Elastic belts enabling slight movements of the wrists and ankles	2/12	25.0
A clock on the wall	2/12	25.0
A window in the restraint room	1/12	8.3
Walls should be painted in nice colours	1/12	8.3
Use of force and power should be minimal	1/12	8.3

5.4. Summary of the results

To summarise, the results of the various study phases are described according to the aims of the study.

The three containment methods gaining most approval among staff were as-needed medication, transfer to special locked wards and mechanical restraint. The method gaining the least approval was the net bed. Total approval scores for the various containment measures were very similar among nurses and doctors. The significant differences appeared in attitudes towards mechanical restraint and constant observation, with doctors showing a more critical attitude. Women tended to be more critical than men, but only IM medication and mechanical restraint reached statistical significance. (Paper I).

The containment measures most accepted by the adolescents were as-needed medication, intermittent observation and time out. Net bed, mechanical restraint and intramuscular medication were most disapproved of. The adolescents were more critical of most containment measures than were the staff. (Paper II).

Among adolescents hospitalized on seven closed wards, the one-year prevalence of mechanical restraint was 9.5%. Among all hospitalized adolescents, the prevalence was 6.9%. The number of mechanically restrained individuals per 100 000 Finnish-speaking inhabitants aged 13 to 17 was 57.1. The median duration of the restraint episode was 4 hours and 50 minutes, but almost half of the mechanical restraint episodes lasted 8 hours or more. Unfortunately, according to official codes in restraint reports, as many as 25% of the mechanical restraint episodes were not based on reasons legalizing the use of mechanical restraint according to the Finnish Mental Health Act. The most frequent diagnostic categories of mechanically restrained adolescents were mood disorders

followed by schizophrenia-related as well as behavioural and emotional disorders. Suicidality and violence were associated with mechanical restraint episodes. Boys were restrained during the first days of hospital treatment significantly more often than were girls, whereas one in four girls experienced her first episode of restraint after one month of hospitalization. (Paper III).

Most of the adolescents experienced mechanical restraint with ambivalence, observing both beneficial and harmful aspects. Most of the adolescents perceived mechanical restraint as a form of punishment, but regardless of this, mechanical restraint was seen as a necessary part of adolescent psychiatry. The most frequent suggestion to improve the intervention was to shorten the mechanical restraint episodes, and more active measures to conclude the ongoing procedure were proposed. Most of the mechanically restrained adolescents did not get a debriefing. (Paper IV).

6 DISCUSSION

The overall goal of the study was to describe and enhance the knowledge of the use of containment measures, especially mechanical restraint, in the inpatient psychiatric treatment of adolescents. The study involved nurses', doctors' and patients' attitudes towards various containment measures, the frequency and features of mechanical restraint episodes, and the patients' experiences of mechanical restraint. This knowledge can be used to improve mechanical restraint practices in adolescent psychiatric nursing. The study has implications for various fields including clinical nursing, management, education and nursing science.

In this chapter, the validity and reliability of the study are discussed first. Second, the main findings of the study are discussed in relation to the literature in accordance with the aims of the study. Third, ethical issues in research on adolescents are discussed. Then conclusions and implications for the development of managing aggression with innovative, patient-oriented methods to improve clinical nursing in mechanical restraint practices are considered. Finally, suggestions for future research are presented.

6.1. Validity and reliability of the study

The validity and reliability of the study reflect the quality of research process (Burns et al. 2009). Validity, essential in evidence-based nursing, measures the accuracy and truthfulness of the study in relation to the phenomenon under research (Lynn 1986, Walker 2005). Simply, it shows if what is measured is what was supposed to be measured. (DeVon et al. 2007.) Reliability pertains to the ability of an instrument to measure a feature uniformly. It shows how accurate the measurement is (Vehkalahti 2008).

The validity and reliability of the study are next discussed in relation to the study phases considering relevant aspects in each phase.

Phase I

External validity is concerned with the extent to which the study findings can be generalized over the study sample (Bowling 2004; Polit & Beck 2010). The present study was carried out in only one hospital district. However, HUS is the largest hospital district in Finland (Annual report of HUS 2009). At national-level there are no other hospital districts with so many adolescent psychiatric units as there are in HUS. This means that the number of staff working in adolescent psychiatric inpatient care is high compared to other hospital districts. On the other hand, HUS covers the metropolitan region with its notorious metropolitan phenomena (drug-related problems, for example), which may have influenced the experiences of the staff resulting in more acceptance of coercion. At international level the results should be generalized with caution as both the legislation as well as psychiatric practices vary widely across countries.

It is important that the study participants have personal experience of the matter studied (Burns et al. 2009). In the present study, the sample consisted of staff, who had experienced most of the containment measures studied in their everyday working life. The study sample should be determined carefully from the universe/basic sample. It should include all features and be large enough (Vilkka 2007). The experience of the members of the research group was that the participants of the present study were typical staff members from adolescent psychiatric units and the structure of the staff was representative of that on Finnish adolescent psychiatric wards. The study population comprised nurses, who bear the main burden of managing disturbed behaviour and implement containment methods and doctors who legally authorize their use. The participation rate can be considered satisfactory for questionnaire research.

The timing of the data collection should be chosen so that the examinees are present. In the present study, the timing of data collection was planned so as not to include summer time with annual holidays and more temporary staff.

Phase II

A weakness of the study was the relatively low participation rate of patients (Vehkalahti 2008, Burns & Grove 2009). Since the questionnaires did not include any personal identification data, the researcher was unable to specify any attributes of the drop out group. It is not known how much of the drop-out was due to a patient being too emotionally unstable to take part in the study and how much was due to unwillingness to participate. The recruitment of the participants was conducted by the ward personnel. This may cause bias as different nurses make different interpretations, notably concerning an adolescent being able to give informed consent.

The ACMQ had not been used in adolescent populations before. Nurses on the wards were of the opinion that the questionnaire was too long for adolescents. They also reported, that it was difficult to fill in for adolescents who had not experienced containment measures. A pilot study would have revealed these problems, but, unfortunately, no pilot study was done. The low participation rate can, at least partly, result from inappropriateness of the questionnaire to adolescent populations.

Because of the small number of participants, the study must be seen as preliminary. The research, however, yielded new information about containment measures used in adolescent psychiatric care and the results of the study proved to be congruent with those of earlier studies in adult psychiatric nursing.

The sample was drawn from southern Finland including the metropolitan region, where the adolescent patient population includes somewhat more immigrants and refugees as well as youngsters with narcotic problems, and may differ slightly from populations in other parts of Finland. Again, as in Phase I, the results must be generalized with caution as both legislation and psychiatric practices vary greatly across countries.

Phase III

In the present study, the restraint reports of seven closed wards for Finnish-speaking adolescents in one hospital district were analysed, the study period being one year. As mentioned before, HUS is the biggest hospital district in Finland covering an area with approximately 1.4 million inhabitants. At national-level there are no other hospital districts with so many adolescent psychiatric closed wards as in HUS. Nevertheless, there were only 47 mechanically restrained adolescents with altogether 161 mechanical restraint episodes. The finding underlines that register studies focusing on mechanical restraint in adolescence should be conducted nation-wide.

In register studies there may be problems in obtaining accurate, reliable and comparable data. It might be that the reasons for mechanical restraint episodes were not coded in the same way by doctors in duty. In the present study, some items were not mentioned in medical records. For example, in some cases, information concerning suicidality prior to the mechanical restraint episode (present/ not present) was not always possible to find out from medical records. Diagnostic criteria and disease classifications change over time. In the present study, the study period was only one year, thereby excluding this kind of problems. The diagnoses were drawn directly from patients' medical records. In this regard, the basic diagnostic procedures in Finland have proven reliable (Isohanni et al. 1997, Pihlajamaa et. al. 2008).

Although register-based studies have the advantage of producing structured data for quantitative analyses, they always miss nuances that could be included by using qualitative methods. In the present study, C-GAS assessments were based on record information and were made by only one evaluator (A.H.). In clinical practice, evaluation is usually team work and the evaluators have the opportunity to observe the patient.

In line with Phase II, the results of the present study, which covered the metropolitan region with its characteristic phenomena (i.e. drug- and refugee-related problems), should not be directly applied to other regions in Finland. Again, the results should be generalized with caution to other countries using mechanical restraint because legislations controlling the practice vary so much.

Phase IV

The adolescents were recruited by the ward personnel. This may distort the results, as different nurses make different interpretations, for example about a patient being willing to join the study and a patient being able to give informed consent. The number of adolescents interviewed remained small and the study must be regarded as preliminary. However, the results were mostly congruent with those of earlier studies. The sample consisted mostly of females, and in adult psychiatry studies have reported gender differences in attitudes towards various containment measures, and specifically that females are more critical than males (Whittington et al. 2009).

The study sample consisted of adolescents who had experienced a mechanical restraint episode during their current in-patient adolescent psychiatric care. They can therefore be considered suitable informants. This enhances the credibility of the study. Respondents also had an opportunity to clarify unclear questions during the interviews, but, overall, the questions were well understood. One researcher conducted all the interviews and transcribed them. This ensured the consistency of the study. To overcome influence caused by the researcher's own perceptions, the transcribed interviews were read several times by two members of the research group. (Bowling 2004, Polit & Beck 2010.)

One of the many advantages of face-to-face interviews is that the interviewer can elicit responses and clarify any ambiguities. More complicated and detailed questions can be asked by interviewing adolescents than in questionnaires. One can elicit more information in greater detail and misinterpretations can be corrected while interviewing the participants. Response rates are often higher when interviewing people than when using questionnaires (Bowling 2004, Burns & Grove 2009). Open-ended questions can be asked to enable adolescents to express their opinions on more complex subjects (Bowling 2004).

A disadvantage of interview method is the potential for interviewer bias with additional bias if some participants are also interpreters. However, semi-structured interviews, when carefully designed for the subject, can obtain high valid data, but the subject has to be amenable to that method (Bowling 2004). In the present study, the method used may have led to under-reporting of experiences regarding mechanical restraint in adolescent psychiatry due to the effect of social desirability, not least because the interviewer worked part of the data collection time in the administration of the adolescent department.

The feasibility of semi-structured adolescent interviewing as a method of data collection depends especially on interviewers' ability to gain adolescent's confidence and to get involved in the interaction between themselves and the adolescents. Pilot interviews add reliability and validity of the actual interviews. They make it possible to learn to ask the kinds of questions that are suitable in terms of the reliability of the data. In the present study, unfortunately, no pilot interviews were conducted.

When the aim is to collect reliable data from adolescents, special attention should be paid to the individuality of the adolescents and their particular developmental stage, regardless of their numerical age. The purpose is to get the adolescents to talk about what they know. At the beginning of the interviews, when eliciting adolescents' experiences, it is good practice to accept their answers without any criticism whatsoever. If the answer is unsatisfactory, the interviewer can revert to the question later on or in another way (Kortesluoma et al. 2003). This was done in the present study.

In the present study, the motivation of the researcher was to give a voice to adolescents concerning mechanical restraint practices. This fitted well with her professional

commitment as a nursing director in mental health nursing and adolescent psychiatry, because health care professionals have been dissatisfied with the inadequacy of health care delivery concerning containment measures in adolescent psychiatry. However, she had to face the problem of being in two different positions at the same time: on the other hand, she was an objective researcher (outside), on the one hand a manager of the nursing staff (insider). In order to deal with this, she spent as little time as possible with the staff during the interview visit to the wards. This was to avoid giving priority to the staff over the adolescents' experiences.

The adolescents realized that the researcher was a nurse, though outside the everyday life of the unit. The adolescents may have considered the researcher a person who could help them, because nurses typically do so. They may also have perceived her as a confidante to whom they could tell a few home truths. All these attitudes were present from time to time. Because there was an adult interviewing adolescents, it offered better objectivity in the study process, but entailed a greater risk of evaluating adolescents' experiences with adult eyes and values. (Greig & Taylor 1999.)

A position of gender neutrality is impossible for a researcher (Hammersley & Atkinson 1995). From the adolescent's point of view, many experiences, for example abusive experiences, are gender bound. In the present study it may be that the girls interviewed felt it easy to talk about humiliating experiences like male nurses watching their naked bodies or male nurses being present when they were urinating, because the researcher was a woman. The physical stature of the researcher has been claimed to be relevant, too. A small woman, like the interviewer in the present study, was less threatening to the adolescents, who were still growing (Claveirole 2004).

The researcher has to take into account the possibility of data quality compromise when psychiatric patients are recruited into the study (Moyle 2002). Severe depression as well as schizophrenia-related disorders, for example, can influence the quality of data collected because the participant may have problems to recall or articulate events. In the present study six persons were suffering from schizophrenia-related disorder and three persons from severe depression.

Psychological distress experienced prior to or during the interview is known to influence data quality (Gardner 2010). When interviews unlock emotionally laden experiences, techniques to minimize distress must be part of the interview protocol. Such techniques include, for example, proactive explanation of risks for distress, empathetic acknowledgement of distress, breaks or even discontinuing the interview (Kavanaugh & Ayres 1998, Vig et al. 2003, Gardner 2010). In the present study, recalling the mechanical restraint episode surely evoked psychological stress in some participants, but none of the adolescents needed a break and no-one wanted to stop the interview.

6.2. Main findings

6.2.1. *Staff's attitudes towards various containment measures*

The staff in the present study expressed higher levels of acceptance of all eleven containment measures than did their colleagues previously in the field of adult psychiatry in both the UK and the Netherlands (Bowers et al. 2004, Bowers et al. 2007, Whittington et al. 2009) and adult patients in the UK (Whittington et al. 2009). High level of approval of containment has previously been reported in Finnish adult psychiatry (Bowers et al. 2007). This may result from high rates of involuntary treatment and legal detention in both Finnish adolescent psychiatry (Kaltiala-Heino 2004, Siponen et al. 2007, Ellilä et al. 2008) and in Finnish adult psychiatry (Salize & Dressing 2004). This finding supports the conclusions of Bowers et al. (2004), that evaluations of psychiatric containment methods can be attributed to national cultures.

Mechanical restraint was considered the most effective containment method, whereas IM medication got the highest rates of acceptability from the staff. PRN (as-needed) medication was considered the most dignified and safest for both the staff and adolescents. The staff was most prepared to use PICU (transfer to specialist ward for disturbed patients). The three methods that received the highest total approval rates were PRN (as-needed) medication, transfer to special locked wards and mechanical restraint. Comparing the results of the present study to those reported earlier by Bowers et al. (2007), it seems that staff working in adult psychiatry both abroad and in Finland accepted mechanical restraint less than did the staff in adolescent psychiatry in HUS. The Finnish mental health legislation may have an impact on this finding, because it states that the under-aged patient may not be left alone while secluded/restrained (revised Mental Health Act 1423/2001, 22f§). The net bed received the lowest total approval ranking. The reason for this is most probably that it is completely unfamiliar to Finnish psychiatric culture. The same finding has been reported earlier in adult psychiatry in Finland, in the UK and in the Netherlands (Bowers et al. 2007). The findings of the present study strengthen the existing results that staff tends to reject unfamiliar containment measures. On the other hand, higher degrees of personal involvement with containment measures increase acceptance. (Exworthy et al. 2001, Holt 2004, van Doeselaar et al. 2008, Whittington et al. 2009.)

The nurses' and doctors' total approval scores for various containment measures proved to be very similar. This may be a reflection of a cultural consensus among staff members working in adolescent inpatient wards. The only difference was that the doctors were more critical towards mechanical restraint and constant observation than were the nurses. This difference may be explained by the fact that nurses spend more time on the ward with adolescents and face adolescents' aggressiveness more often than the doctors do.

The male staff in the present study tended to be more approving of various containment methods than the female staff. However, only IM medication and mechanical restraint

reached statistical significance. Male staff showed higher levels of approval of every coercive method other than time out, psychiatric intensive care and IM medication in a recent study by study Whittington et al. (2009). In line with the earlier study by Whittington et al. (2009), the younger staff was significantly more approving of net beds than the older staff was.

6.2.2. Adolescents' attitudes towards various containment measures compared to those of the staff

The hypothesis that under-aged patients would evaluate containment measures with greater criticism when compared to the staff, was supported. Just as in the study among adult service users by Whittington et al. (2009), the adolescents most approved of PRN (as-needed) medication, intermittent observation and time out. The most disapproved of method by both the adolescents was the net bed, which has never been used in Finland. It was seen as a distressing, inhumane and cruel method.

Adolescents rated mechanical restraint among the three least accepted, while staff ranked it among the three most accepted containment methods. Adolescents considered mechanical restraint as distressing and not consistent with human dignity. The criticism of the adolescents was in line with the findings among adult service users (Meehan et al. 2004, Whittington et al. 2009). The positive attitudes of the staff could result from the Finnish mental health law stating that the under-aged patient may not be left alone while restrained. The law has been implemented in most adolescent units using mechanical restraint, which allows the nurse to sit beside the hospital bed and care for the patient. The adolescents disapproved of compulsory IM medication which concerns with the study by Whittington et al. (2009) among adult patients. High rates of intramuscular medication have been shown to relate to negative attitudes towards containment regardless of whether patients had or had not been previously injected (Dack et al. 2012).

6.2.3. Frequency and features of mechanical restraint

In the present study, the one-year prevalence of mechanical restraint was 9.5% on closed wards (the number of wards = 7, the number of patients =493, the number of treatment days = 18 608). Among all in-patients (the number of wards= 15, the number of patients= 680, the number of treatment days= 32 983), it was 6.9%. Direct comparisons are not possible as both legislations and psychiatric practices vary greatly across countries, but in a North American study (Donovan et al. 2003) among 5- to 18-year-old in-patients, the two-year prevalence of the use of restraint was 49%. In our study, the number of mechanically restrained persons per 100 000 13- to 17-year-old Finnish-speaking inhabitants was 57.1. The researcher did not find any population-level data on the use of mechanical restraint among adolescents in other countries, but in adult populations the number has varied in recent years between 12.6 (the Netherlands) to 20.9 (Switzerland), and even to 38.7 (Finland) (Steinert et al. 2010). The use of mechanical restraint should be a last resort intervention (Larson et al. 2008). Both Finnish Mental Health Act and

The American Academy of Child and Adolescent Psychiatry guideline (AACAP 2001) recommend the use of restraint always to be limited to situations in which prevention strategies are ineffective and an adolescent is in danger of hurting him/herself or others. In the light of the present frequency numbers, it is questionable whether the Finnish law and the guideline are followed at the grassroots.

The median duration of the mechanical restraint episodes was 4 hours and 50 minutes in the present study. Almost half of the mechanical restraint episodes lasted 8 hours or more. As many as one in four mechanical episodes lasted 13 or more hours. In foreign studies the mean durations have been consistently lower (Garrison et al. 1990, Donovan et al. 2003). In a Finnish adult psychiatry study, the median duration of mechanical restraint episodes has been reported to be approximately 7 hours (Keski-Valkama et al. 2007). A majority of mechanically restrained adults (Wynn 2004) as well as minors (LeBel et al. 2004) view the process as a negative experience, partly because of its long duration (Kontio et al. 2012). Principle 11 of the United Nations General Assembly states that the physical restraint of a patient should not last any longer is necessary for the patient. How this principle was upheld among adolescents in the light of the median duration of restraint episodes in this study should be explored.

One in four mechanical restraint episodes was not based on a reason accepted in Finnish mental health law. Among adolescents; the only acceptable reasons for mechanical restraint are harming/threat of harming oneself or others. The unlawful intervention occurred more frequently among boys than among girls. The finding raises the need for prompt training of nurses and doctors as well as the need to make sure that the codes are interpreted in the same way by them.

In the present study, the boys were more often mechanically restrained during the first days of the treatment period than the girls. Approximately 25% of girls experienced the first episode of mechanical restraint after one month of admission. This result may follow from the clinical finding that for some girls, long treatment periods provide more opportunities for self-harming behaviour. The issue needs future research.

Most mechanically restrained adolescents suffered from mood disorders or then by schizophrenia-related and behavioural and emotional disorders. Mood disorders have been shown to be the most common diagnosis in Finnish inpatient care (Ellilä et al. 2004), also among both involuntarily referred adolescents (Kaltiala-Heino 2010) and involuntarily treated ones (Khenissi et al. 2004). Psychotic disorders have been strongly related to mechanical restraint in studies among adolescents (Sourander et al. 2002, Delaney & Fogg 2005). In a study by Sourander et al. (2002), conduct disorders were related to time out, but not mechanical restraint. In the studies by Atkins et al. (1992) and Goren et al. (1993), behavioural and conduct disorders as well as other disruptive disorders were related to mechanical restraint. In this study, mechanically restrained boys suffered from behavioural and emotional disorders (F90-98) significantly more

often than did the girls. This probably reflects the known preponderance of males with these disorders (Kazdin 1995).

As-needed medication is typically offered to a patient in order to prevent the need for containment measures. In the present study, such medication was administered prior to approximately one in three mechanical restraint episodes. This is in agreement with other studies of minors (Donovan et al. 2003, Delaney & Fogg 2005). Chemical restraint can be defined as a drug used to control behaviour or to alleviate a patient's medical or psychiatric condition (Masters et al. 2002). Some mechanically restrained adolescents received IM medication during the mechanical restraint period. Even though this "double restraint" was seldom used, oral antipsychotic medication was initiated or the dosage of scheduled oral antipsychotic medication was increased on some occasions. This can reflect the adolescent's poor psychiatric condition, but it also raises the question of a possibly iatrogenic (i.e. restraint-induced) worsening of a clinical condition and therefore the need for higher dosages.

Our study confirms previous findings that suicidality (Sourander et al. 2002, Delaney & Fogg 2005) as well as both threats of violence and actual violence frequently (Morrison & Lehane 1996, Salib et al. 1998, Smith & Humphreys 1997, Sourander et al. 2002) precede mechanical restraint. Boys were significantly more frequently mechanically restrained due to both threats of violence and actual violent behaviour than girls were. The result is in line with the findings that boys tend to engage in more aggressive and more serious forms of antisocial behaviour than females do (Rutter et al. 1998, Tiet et al. 2001, Rey et al. 2005).

6.2.4. Adolescents' experiences and opinions of mechanical restraint

Contrary to some older studies among secluded adults (Binder & McCoy 1983, Hammill et al. 1989, Alty & Mason 1994), all the adolescents were able to give an explanation for their mechanical restraint episodes. As in the recent study by Keski-Valkama et al. (2010b), the explanations adolescents gave corresponded in most cases to the reasons recorded in the hospital files. For the treatment relationship between adolescent and staff, it is important that the mechanically restrained adolescent and the staff share an understanding of the reasons leading to mechanical restraint.

The adolescents experienced mechanical restraint with ambivalence, finding in it both benefit and harm. In accordance with some coercion studies of adult patients (Meehan et al. 2000, Kjellin et al. 2004), the adolescents associated mechanical restraint with protection and feelings of safety and calm. The nurse sitting beside the hospital bed taking care of the patient was regarded as an opportunity for meaningful conversations. Most adolescents felt that the mechanical restraint episode was too long and also that the need for this intervention had passed long before they were released from the belts. This was one of the reasons why the patients regarded mechanical restraint as punishment. The same finding has been reported repeatedly in adult psychiatry (Hoekstra et al. 2004,

Holmes et al. 2004, Keski-Valkama et al. 2010b, Kontio et al. 2012). Both Principle 11 of the United Nations General Assembly and the Finnish Mental Health Act state that the restraint of a patient should not be prolonged beyond what is strictly necessary for this purpose. The result of the present study indicates that there should be more active measures to evaluate the possibility of ending an ongoing mechanical restraint episode.

One of the harmful effects of mechanical restraint mentioned by the adolescents was physical pain caused by the belts and long periods in the supine position with no opportunity to move. In adult psychiatry, more comfortable beds (Keski-Valkama et al. 2010b, Kontio et al. 2012) and safely furnished environments in restraint rooms (Kontio et al. 2012) have been suggested.

In line with the studies in adult psychiatry (Keski-Valkama et al. 2010b, Kontio et al. 2012) adolescents felt that being in a restraint room was boring and distressing because they had nothing to do. Meaningful activities are basic human needs. According to a statement by the European Committee for the Prevention of Torture and Inhuman or Degrading Treatment or Punishment (2009), in a seclusion/restraint room, patients should have access to various activities. Nevertheless, most seclusion and restraint rooms in Finland are still depriving. One suggestion for improving the intervention was to enable patients to listen to music, read or draw during their mechanical restraint episode. As Kontio et al. (2012) concluded, although one could argue that a patient capable of doing these things need not even be restrained, the findings indicate a need for radical changes in the Finnish culture and practices of seclusion/restraint.

Regardless of the Finnish mental health law stating that all coercive methods should be based on care, most adolescents regarded mechanical restraint as a punishment. This finding is in accordance with those reported among secluded adolescents (Miller 1986, Martinez et al. 1999) and adults (Keski-Valkama et al. 2010b). In adult psychiatry, patients have reported that their basic physical needs had not been taken into consideration during their seclusion/mechanical restraint periods. Such improvements, as the option to use the toilet (Kontio et al. 2012) and easier access to the toilet and shower have been proposed by patients (Keski-Valkama et al. 2010b). This problem was also raised by the adolescents who felt the use of bedpans was humiliating. Some of the adolescents emphasised that the lack of privacy while urinating or defecating was unpleasant. Their feelings of humiliation were also emerged in situations where girls were obligated to change clothes while male nurses watched them. Nakedness is psychologically difficult for most adolescents with changing bodies and emerging feelings of sexuality. This is something staff should always bear in mind and respect. Among adult patients, the opportunity to use one's own clothes during seclusion/mechanical restraint has been requested (Keski-Valkama et al. 2010b).

Most adolescents considered interaction with the staff sufficient during the mechanical restraint episode. This finding differs from recent results in Finnish adult psychiatry, where patients have expressed negative feelings because of a lack of therapeutic

interaction with the staff. Suggestions for improving seclusion and mechanical restraint practices have been justified with poor communication by personnel (Keski-Valkama et al. 2010b, Kontio et al. 2012).

In line with studies in adult psychiatry (Meehan et al. 2000, Keski-Valkama et al. 2010b), most of the adolescents did not receive a debriefing after their mechanical restraint episode. Adult patients have expressed a need to discuss their coercion events and their feelings afterwards (Ryan & Happell 2009, Keski-Valkama et al. 2010b, Needham & Sands 2010, Kontio et al. 2012). In this light, it was somewhat surprising that most of the adolescents did not express a need for a debriefing after their mechanical restraint episodes. This may be because most adolescents found their interaction with the staff sufficient during mechanical restraint. On the other hand, a debriefing could be a useful tool for the continuous and systematic assessment of mechanical restraint practices. A debriefing could also be an opportunity to prepare the future behaviour of mechanically restrained patients and to prevent unnecessary mechanical restraints by discovering and analysing the earlier restrictive measures in advance.

Because of their developmental level, adolescents are less competent than adults in evaluating the consequences of their choices. Mental disorders further impair their capacity and evaluating capacity (Kaltiala-Heino & Fröjd 2007). Balancing adolescents' rights to self-determination, the right to be protected and cared for, and their need for treatment is ethically challenging for the staff (ETENE 2010b). The adolescents in the present study considered mechanical restraint a necessary measure in psychiatric care, mostly because of the violent behaviour of the patients. The adolescents turn to be active commentators with many ideas about how to improve mechanical restraint practices. In the future, adolescent patients should play an active role in developing in-patient aggression management programmes in Finnish adolescent psychiatry.

6.3. Ethical issues in research on adolescents

Doing research with adolescents, it is important to be balanced in respecting their voices and in responsibility for their best interests. This is possible by paying attention to ethical and methodological issues in the study. Declaration of Helsinki aims to protect research subjects from any harm from research. It states that adolescents participating in research must be given adequate information, have the opportunity to participate voluntarily and to withdraw from the research at any time. Adolescents' integrity and privacy must be protected and their consent obtained, preferably in writing (World Medical Association 1964/1989). All these aspects were considered in the present study.

Vulnerability in the research context can be defined as risk for coercion, diminished autonomy, injury, or other abuse related to participation in research. It results in the need for increased protection for research subjects. Certain groups, including adolescents, are considered to be vulnerable (National Bioethics Advisory Commission 2001). Young psychiatric patients are a particularly vulnerable population, specific ethical questions

being a person's capacity for understanding the study protocol, free and informed consent, privacy, autonomy and adequate information receiving. All these aspects were taken into consideration in the present study process.

Adolescents' ability to provide informed consent varies and depends on the patient. Adolescents have limited ability to understand the two elements of the concept – information and consent. They should be informed sufficiently and adequately (Ensign 2003). A key component of consent is that the adolescent understands what he/she is going to be involved in. It is important to listen to what adolescents expect to know – and answer their questions. The researcher made defined questions to adolescents to find out if they had understood what they were taking part in, in the interview study. The adolescents' understanding and ability to remember the information given to them was checked by questions in the interview study. Because the adolescents' attitudes to the research project affect their consent, they were well informed about the research. The documentation of consent is important, so it was done by writing. To be able to estimate adolescents' competence, a researcher must have a thorough knowledge of them, their world and the way they develop (Greig & Taylor 1999). In our study the patient's nurse in charge evaluated whether the patient was coherent and emotionally stable enough to give informed consent, to fill in the questionnaire and to participate in the interview.

In research on adolescents, the adolescent has to receive information according to his/her capacity to understand, from staff with experience of adolescents, regarding the research, the risks and the benefits (Woodgate 1998, Davidson & O'Brien 2009). Explaining a procedure to an adolescent as part of consent should always be in terms that the adolescent understands. Ethical guidelines do not to give an exact age above which an adolescent must give their consent. It is inappropriate to strictly define minimum ages of consent, as the maturity of the youngster varies with the complexity of the research project. (Directive 2001/20/EC of the European parliament and of the Council of 4 April 2001). In the present study all the personally contacted adolescents were 15- to 17-year olds. Under 15-year old adolescents participated only in the register study with no personal contact.

The guidelines on research with adolescents state that guardians should give their consent to their offspring participating in research projects (World Medical Association 1964/1989). In Finland, 15-17 year old adolescents are allowed to give their own informed consent, but their parents have to be informed about the research. This was done in the present study. The guardians also had the opportunity to get know the questionnaire focusing on various containment measures and the question formula used in the interviews with the mechanically restrained adolescents.

An information sheet should be written in accessible language and tested on adolescents beforehand (Bowling 2004, Vehkalahti 2008). Unfortunately, in the present study, the information formula was not tested on adolescents beforehand, but the information sheet was given to the adolescent beforehand so that she/he could read it in peace and ask further information if she/he needed. It must be made clear to the adolescents that the

content of their questionnaires and interviews would be kept confidential from all but the researcher and that it would be anonymized in the final research reports (Claveirole 2004.) This was done in the present work.

Adolescents need to be given an opportunity to share their feelings and wishes about the treatment they are receiving (Claveirole 2004). In the United Nations Convention on the Rights of the Child, passed in 1989 and signed by Finland, is enshrined a principle of the importance of consulting adolescents. Article 12 of this Convention states the need to seek and take into account adolescents' wishes when making decisions on their treatment (The United Nations Convention on the Rights of the Child). In the present study, the experiences and opinions of mechanically restrained adolescents were elicited for the first time in a research context.

Some research populations are particularly vulnerable and need special protection. A key concept in these specific clauses regarding adolescents is the degree of risk acceptable for adolescents involved in research. Research involving vulnerable population is only justified if the research is responsive to the health needs and priorities of this population and if there is a reasonable likelihood that this population stands to benefit from the results of the research (Goodyear et al. 2007). The risks involved have to be adequately assessed and be able to satisfactorily manage (Davidson & O'Brien 2009). The possible risk of the present study was that recalling a mechanical restraint episode would have caused intolerable pain. In the present study, all the participants answered the questions willingly and, in fact, some of them even expressed their gratitude because the researcher was genuinely interested in their experiences. This finding also indicates that the nurses in charge were indeed able to evaluate whether the patient was emotionally stable enough to participate the interview study.

Studies need to be designed to minimise pain, discomfort, fear and any other foreseeable risk in relation to the disease and developmental stage. Both the risk threshold and the degree of distress must be specially defined and constantly monitored. (Directive 2001/20/EC of the European Parliament and of the Council of 4 April 2001.) Minimal risk is defined as "risk which is not greater than experienced in the everyday life of an adolescent, including routine testing and psychological or physical examinations". Implementing this definition is problematic. Researchers who work with adolescents should be inventive and observant enough to manage the understandable anxieties and fears of adolescents, without invoking coercion or exerting undue influence. If research involves adolescents, those conducting the research should have particular training in the conduct of research among adolescents. (Davidson & O'Brien 2009.) In the present study, the main researcher, who both planned the project and collected the data, had worked for years in the field of adolescent psychiatric nursing and was familiar with the lives of the adolescents.

Interviews, focusing on personal experiences, may be troublesome, because their content may stir up suffering feelings (King 1996, Laws 1998). Because of this, psychological

support should be available. In the present study, the adolescents were already in the adolescent wards, so they had the option for on-site support if they felt distressed during or after the research projects. The adolescents were also informed that they could withdraw from the study at any stage without jeopardizing their treatment.

Many adolescents like interviews and reply in a co-operative, truthful way (Hill et al. 1996, Borland et al. 2001). In the present study, the adolescents interviewed responded fluently and positively. The interviewer has to remain undetected so as not to influence the content of interviews and at the same time offer understanding and emotional support. Dealing with vulnerable adolescents, the researcher has to be ready to take care of them if the interview appears to be too difficult for them (King 1996). This was realized in the present study too, as the main researcher was a professional in the field of adolescent psychiatric nursing. However, none of the adolescents expressed any need for support during the interviews.

A researcher's prior experience with the group on which she/he focused can help to establish a relationship of trust, which is an important dimension of success. Knowledge of adolescents' world, language and the differences brought about by development and gender will significantly affect both the quality of the data and the ethical integrity of the relationship with the participants. (Claveirole 2004.) The value position and life role of the researcher and the feeling states she experiences regarding the research are meaningful as a research instrument. The approach of the researcher during the interviews is crucial. Again, in the present study, this was realized because of the experience and attitude of the main researcher.

In summary, all research involving human subjects should be conducted in accordance with three ethical principles: respect for persons, beneficence and justice. Special justification is required for inviting vulnerable individuals to serve as research subjects and, if they are selected, the means of protecting their rights and welfare must be rigorously applied. Before undertaking research involving adolescents, the investigator must ensure that 1) the research might not be carried out equally well with adults, 2) the legal representative of an adolescent has been informed, 3) the agreement of each adolescent has been obtained to the extent of the adolescent's capabilities and 4) the adolescent's refusal to participate or continue in the research will be respected. (CIOMS 2002.) In the present study, all these conditions were complied with.

6.4. Conclusions

According to the research findings, the following areas where mechanical restraint could be improved in adolescent psychiatric inpatient care were identified:

Nurses and doctors working in Finnish adolescent psychiatry express high levels of acceptance of containment measures. The attitudes of staff steer the care on adolescent wards. Their attitudes deviate from the national programme, and from international

guidelines which advocating the reduction of coercion. At the same time, adolescents assess containment measures more critically than does the staff. The patient's voice should be listened to more carefully by the staff. Their ideas and opinions about how to cope with various situations should be documented in patient records. If this is done, the patients can really participate in their own psychiatric treatment.

In the light of the study results in HUS, the prevalence of mechanical restraint and the number of lengthy mechanical restraint episodes are high. There is a need to reduce both of these. Even though most mechanically restrained adolescents know the reason for their mechanical restraint, they experience it with ambivalence seeing both benefit and harm in it. At the same time, they also consider it to be a form of punishment. Nevertheless, they considered mechanical restraint a necessary measure in a psychiatric hospital setting, mostly because of the violent behaviour of the patients. Because of this, there is an urgent need to develop new methods to deal with the violent behaviour of adolescents in the adolescent psychiatric wards. The adolescents are active commentators with many ideas about how to improve mechanical restraint practices and, because of this, they should be included in the development of programmes to reduce the use of mechanical restraint in adolescent psychiatry.

6.5. Implications

The study investigated the use of mechanical restraint in adolescent psychiatric care, and has implications for various fields including clinical nursing, nursing education, management and nursing science.

1. Clinical nursing

Because it seems, that the number of mechanical restraint episodes as well as that of lengthy episodes is high, it is important to invest effort in reducing the number and shortening the length of mechanical restraint episodes in adolescent psychiatric nursing. Special programmes are needed to reduce the use of mechanical restraint in adolescent psychiatry.

Staff should be aware of how adolescent in-patients experience various containment methods and how they prefer to be treated. New ways to manage crisis situations should be developed. Information, explanation of the procedures involved and debriefing should be offered to every adolescent undergoing restraint.

2. Nursing education

The study indicated that there is a lack of ethical and theoretical utilization of alternative methods dealing crises situations among the staff. The staff working in adolescent psychiatry needs wide-ranging and in-depth training in order to reduce the use of containment measures.

3. Management

The research findings proved that the staff's attitudes need to be discussed constructively and the use of containment measures needs to be reduced by setting concrete objectives. Nursing managers have an important role in changing the treatment culture on adolescent psychiatric wards. More supervision is also needed. Nursing managers have to monitor that the number of staff members is adequate in regard to the number of hospital beds in the wards.

4. Nursing science

The study produced evidence based knowledge about mechanical restraint in adolescent psychiatric care, from both the adolescents' and staff's perspectives. The use of different data collection methods resulted in a wide picture of mechanical restraint practices. The study indicated needs for nursing science to find new ways to improve professional competence in challenging and ethically ambivalent situations, like restraint. There is a need to further investigate patients and to interact with them more in such situations.

6.6. Suggestions for further studies

The following future research ideas emerged from this study:

1. Studies in adult psychiatry have shown that both the treatment culture and atmosphere in psychiatric wards are associated with the use of restraint (DeBenedictis et al. 2011). This relationship should also be studied in adolescent psychiatry. Also, the relationship between the number of staff in charge as well as their education and the use of containment measures should be studied in the future.
2. Because of the frequent use of mechanical restraint as well as the high number of long mechanical restraint episodes, the clinical decision-making process in adolescent psychiatry should be studied.
3. There is an obvious need for shared intention to treat in adolescent psychiatric treatment. Because of the high number of mechanical restraint episodes, the impact of adolescent-personnel agreement to mechanical restraint rates should be studied in adolescent psychiatry.
4. A nationwide interview study among mechanically restrained adolescents should be designed. Gender differences in experiencing mechanical restraint could thus be studied and the opinions of adolescents with different psychiatric disorders could be compared. A nationwide data set would also permit qualitative analysis in order to gain a more profound understanding.
5. The possible differences in the use of mechanical restraint between different adolescent psychiatric wards in Finland should be studied.

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Espoo, December 2012, when the first snow has fallen down

The image shows two handwritten signatures in black ink. The first signature on the left is 'Anja', written in a cursive style. The second signature on the right is 'Hellmuth', also in a cursive style.

Anja Hottinen

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APPENDICES

Appendix 1

Table. Attitude to Containment Measures Questionnaire (ACMQ)

PRN medication

Medication given at the nurses' discretion in addition to regular doses, by any route, and accepted voluntarily.



Please circle the number that applies, in your opinion, to the statements below about PRN medication:

		Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
1	This containment method is effective	5	4	3	2	1
2	This containment method is acceptable	5	4	3	2	1
3	This containment method respects patients' dignity	5	4	3	2	1
4	This containment method is safe for the staff who use it	5	4	3	2	1
5	This containment method is safe for the patient who is subject to it	5	4	3	2	1
6	I would be prepared to use this method of containment	5	4	3	2	1

Original reference: Bowers, Alexander, Simpson, Ryan, Carr-Walker 2004.

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Physical Restraint

Physically holding the patient, preventing movement.



Please circle the number that applies, in your opinion, to the statements below about physical restraint:

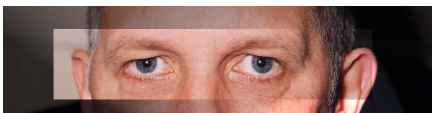
		Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
1	This containment method is effective	5	4	3	2	1
2	This containment method is acceptable	5	4	3	2	1
3	This containment method respects patients' dignity	5	4	3	2	1
4	This containment method is safe for the staff who use it	5	4	3	2	1
5	This containment method is safe for the patient who is subject to it	5	4	3	2	1
6	I would be prepared to use this method of containment	5	4	3	2	1

Original reference: Bowers, Alexander, Simpson, Ryan, Carr-Walker 2004.

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Intermittent observation

An increased level of observation, of greater intensity than that which any patient generally receives, coupled with allocation of responsibility to an individual nurse or other worker. Periodic checks at intervals.



Please circle the number that applies, in your opinion, to the statements below about intermittent observation:

		Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
1	This containment method is effective	5	4	3	2	1
2	This containment method is acceptable	5	4	3	2	1
3	This containment method respects patients' dignity	5	4	3	2	1
4	This containment method is safe for the staff who use it	5	4	3	2	1
5	This containment method is safe for the patient who is subject to it	5	4	3	2	1
6	I would be prepared to use this method of containment	5	4	3	2	1

Original reference: Bowers, Alexander, Simpson, Ryan, Carr-Walker 2004.

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Seclusion

Isolated in a locked room.



Please circle the number that applies, in your opinion, to the statements below about seclusion:

		Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
1	This containment method is effective	5	4	3	2	1
2	This containment method is acceptable	5	4	3	2	1
3	This containment method respects patients' dignity	5	4	3	2	1
4	This containment method is safe for the staff who use it	5	4	3	2	1
5	This containment method is safe for the patient who is subject to it	5	4	3	2	1
6	I would be prepared to use this method of containment	5	4	3	2	1

Original reference: Bowers, Alexander, Simpson, Ryan, Carr-Walker 2004.

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Time out

Patient asked to stay in room or area for period of time, without the door being locked.



Please circle the number that applies, in your opinion, to the statements below about time out:

		Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
1	This containment method is effective	5	4	3	2	1
2	This containment method is acceptable	5	4	3	2	1
3	This containment method respects patients' dignity	5	4	3	2	1
4	This containment method is safe for the staff who use it	5	4	3	2	1
5	This containment method is safe for the patient who is subject to it	5	4	3	2	1
6	I would be prepared to use this method of containment	5	4	3	2	1

Original reference: Bowers, Alexander, Simpson, Ryan, Carr-Walker 2004.

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Compulsory intramuscular sedation

Intramuscular injection of sedating drugs given without consent.



Please circle the number that applies, in your opinion, to the statements below about compulsory intramuscular sedation:

		Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
1	This containment method is effective	5	4	3	2	1
2	This containment method is acceptable	5	4	3	2	1
3	This containment method respects patients' dignity	5	4	3	2	1
4	This containment method is safe for the staff who use it	5	4	3	2	1
5	This containment method is safe for the patient who is subject to it	5	4	3	2	1
6	I would be prepared to use this method of containment	5	4	3	2	1

Original reference: Bowers, Alexander, Simpson, Ryan, Carr-Walker 2004.

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Psychiatric intensive care

Transfer to a specialist locked ward for disturbed patients.



Please circle the number that applies, in your opinion, to the statements below about psychiatric intensive care:

		Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
1	This containment method is effective	5	4	3	2	1
2	This containment method is acceptable	5	4	3	2	1
3	This containment method respects patients' dignity	5	4	3	2	1
4	This containment method is safe for the staff who use it	5	4	3	2	1
5	This containment method is safe for the patient who is subject to it	5	4	3	2	1
6	I would be prepared to use this method of containment	5	4	3	2	1

Original reference: Bowers, Alexander, Simpson, Ryan, Carr-Walker 2004.

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Mechanical Restraint

The use of restraining straps, belts or other equipment to restrict movement.



Please circle the number that applies, in your opinion, to the statements below about mechanical restraint:

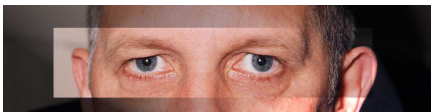
		Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
1	This containment method is effective	5	4	3	2	1
2	This containment method is acceptable	5	4	3	2	1
3	This containment method respects patients' dignity	5	4	3	2	1
4	This containment method is safe for the staff who use it	5	4	3	2	1
5	This containment method is safe for the patient who is subject to it	5	4	3	2	1
6	I would be prepared to use this method of containment	5	4	3	2	1

Original reference: Bowers, Alexander, Simpson, Ryan, Carr-Walker 2004.

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Constant observation

An increased level of observation, of greater intensity than that which any patient generally receives, coupled with allocation of responsibility to an individual nurse or other worker. Constant: within eyesight or arms reach of the observing worker at all times.



Please circle the number that applies, in your opinion, to the statements below about constant observation:

		Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
1	This containment method is effective	5	4	3	2	1
2	This containment method is acceptable	5	4	3	2	1
3	This containment method respects patients' dignity	5	4	3	2	1
4	This containment method is safe for the staff who use it	5	4	3	2	1
5	This containment method is safe for the patient who is subject to it	5	4	3	2	1
6	I would be prepared to use this method of containment	5	4	3	2	1

Original reference: Bowers, Alexander, Simpson, Ryan, Carr-Walker 2004.

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Net bed

Patient placed in a net bed enclosed by locked nets, which he or she is unable to leave.



Please circle the number that applies, in your opinion, to the statements below about net beds:

		Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
1	This containment method is effective	5	4	3	2	1
2	This containment method is acceptable	5	4	3	2	1
3	This containment method respects patients' dignity	5	4	3	2	1
4	This containment method is safe for the staff who use it	5	4	3	2	1
5	This containment method is safe for the patient who is subject to it	5	4	3	2	1
6	I would be prepared to use this method of containment	5	4	3	2	1

Original reference: Bowers, Alexander, Simpson, Ryan, Carr-Walker 2004.

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Open area seclusion

Isolated in a locked area, accompanied by nurses.



Please circle the number that applies, in your opinion, to the statements below about open area seclusion:

		Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
1	This containment method is effective	5	4	3	2	1
2	This containment method is acceptable	5	4	3	2	1
3	This containment method respects patients' dignity	5	4	3	2	1
4	This containment method is safe for the staff who use it	5	4	3	2	1
5	This containment method is safe for the patient who is subject to it	5	4	3	2	1
6	I would be prepared to use this method of containment	5	4	3	2	1

Original reference: Bowers, Alexander, Simpson, Ryan, Carr-Walker 2004.

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Appendix 2

Table. Question formula used in the interviews with the mechanically restrained adolescents (modified from Keski-Valkama 2010)

The question formula used in the interviews of the mechanically restrained adolescents.
What was the reason for the index mechanical restraint episode?
Did you regard being mechanically restrained as a positive experience?
Did you regard being mechanically restrained as a negative experience?
Did you regard being mechanically restrained as beneficial? Why?
Did you regard being mechanically restrained as harmful? Why?
Did you regard being mechanically restrained as punishment? Why?
Did you regard the opportunity to discuss with staff as sufficient or insufficient during mechanical restraint?
Did you receive a debriefing after mechanical restraint? If not, would you have needed one?
What alternatives, if any, would you have proposed instead of, or before being mechanically restrained: a) activities, b) medication, c) rest in your room, d) verbal de-escalation or e) something else?
Do you think that mechanical restraint is necessary in psychiatric hospitals? Why?
On the basis of your experience, do you have any improvements to propose for the present use of mechanical restraint?

The question formula was modified with the kind permission of the copyright holder Alice Keski-Valkama.