

Aus der Klinik für Psychiatrie und Psychotherapie
des Jüdischen Krankenhauses Berlin

DISSERTATION

Determinanten eines vorzeitigen Therapieabbruchs: Über den Einfluss psychosozialer und soziodemographischer Faktoren, externer Ereignisse sowie subjektiver Schlafqualität während der stationären qualifizierten Entzugsbehandlung bei Patienten mit Alkohol- und Drogenabhängigkeit auf den Therapieerfolg

zur Erlangung des akademischen Grades
Doctor rerum medicinalium (Dr. rer. medic.)

vorgelegt der Medizinischen Fakultät
Charité – Universitätsmedizin Berlin

von

Yvonne Sofin

aus Frankfurt am Main

Datum der Promotion: 06.März 2020

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ABSTRAKT

Einleitung Sucht ist eine chronische Erkrankung, die Millionen von Menschen weltweit betrifft. Die Entgiftung ist der erste Schritt in der stationären Alkohol- und Drogentherapie. Der vorzeitige Behandlungsabbruch ist eine häufige Komplikation, die den langfristigen Verlauf der Krankheit negativ beeinflusst. Im Rahmen der vorliegenden Publikationsdissertation wurden anhand von drei Studien potentielle Determinanten eines vorzeitigen Therapieabbruchs untersucht.

Methodik Während der Aufnahmeuntersuchung wurden soziodemographische und medizinische Variablen von 832 Suchtpatienten erhoben und nach signifikanten Assoziationen hinsichtlich eines irregulären bzw. regulären Behandlungsabschlusses gesucht. In der zweiten Studie wurde der Einfluss der Fußball-Europameisterschaft 2012 auf die Behandlungstreue untersucht. Dabei wurden vier zu vergleichende Perioden definiert und die Aufnahmen zur qualifizierten Entzugstherapie sowie die vorzeitigen Entlassungen gegenübergestellt. In der dritten Studie wurde unter Verwendung des Pittsburgh Sleep Quality Index (PSQI) untersucht, welchen Einfluss die subjektive Schlafqualität während der qualifizierten Entzugsbehandlung auf den Behandlungsabschluss hat und ob schlechter Schlaf als Prädiktor eines vorzeitigen Therapieabbruchs herangezogen werden kann.

Ergebnisse 37% der Patienten brachen die Behandlung in der ersten Studie vorzeitig ab. Weibliches Geschlecht, Partnerschaft, Berufstätigkeit und gute Bildung waren prädiktiv für einen regulären Behandlungsabschluss, während jüngeres Alter, männliches Geschlecht, eine hohe Anzahl vorhergehender Therapieabbrüche sowie Delinquenz als Prädiktoren für einen irregulären Behandlungsabschluss identifiziert werden konnten. Die Abbruchquote der zweiten Studie lag bei 26% bzw. 30%. Bei den männlichen Patienten war nach der Europameisterschaft ein signifikanter Anstieg der Aufnahmen zu beobachten. Die Abbruchquote in der dritten Studie betrug nur 7%. Die Prävalenz von Schlafstörungen (PSQI-Wert > 5) betrug 70%. Die Schlafqualität bei der Aufnahme war prädiktiv für die Schlafqualität bei der Entlassung. Die Schlafqualität während des Entzuges jedoch war nicht prädiktiv für einen irregulären Behandlungsabschluss.

Diskussion Anhand der vorliegenden Arbeit konnten die klinischen Kenntnisse über Determinanten eines vorzeitigen Therapieabbruchs erweitert werden. Die Ergebnisse deuten darauf hin, dass vorwiegend sozial stabile Patienten vom derzeitig etablierten Behandlungsetting profitieren. Unsere Untersuchungen legen weiterhin nahe, dass Sportgroßereignisse für männliche Patienten ein Auslöser für einen Therapieabbruch sein können, hier könnten gesellschaftspolitische Maßnahmen zu einer Verbesserung führen. In Anbetracht der Prävalenz von Schlafstörungen während des Entzuges erscheint es sinnvoll, das stationäre Behandlungskonzept um Maßnahmen zur Behandlung von Schlafstörungen zu erweitern.

ABSTRACT

Introduction Addiction is a chronic disease that affects millions of individuals worldwide. Qualified detoxification treatment is the first step in inpatient substance abuse treatment. Premature treatment discontinuation is a common complication with negative impact on the long-term course of the disease. Regular treatment completion is therefore a key success criterion of detoxification treatment. The aim of the present doctoral thesis was to determine the influence of socio-demographic environment, international sports events and sleep quality on qualified detoxification treatment outcome.

Method Data on the patient's social environment and medical anamnesis were collected from 832 patients and analysed with respect to the prediction of regular, respectively irregular treatment outcome. The second study aimed to evaluate a potential effect of international sports events on qualified detoxification outcome. Four periods were defined to determine admission and unplanned discharge rates prior to, during and after the European Football Championship. The aim of the third study was to evaluate sleep quality during qualified detoxification treatment and whether bad sleep might serve as a predictor of premature treatment drop-out.

Results The drop-out rate in the first study was 37%. A stable social network in terms of family, employment and education and a lower dependency severity positively predicted treatment outcome, whereas an unstable social environment, younger age, male sex and a high number of previous drop-outs were predictive for a premature treatment drop-out. In the second study, the admission rate of male patients increased significantly after the European Football Championship had ended. The drop-out rate measured 26% respectively 30%. In the third study, at admission, impaired sleep was observed in 70% of the patients. Sleep quality at admission predicted the change of sleep quality during qualified detoxification treatment. But sleep quality was not a predictor for unplanned treatment drop-out. With only 7% the drop-out rate was remarkably low.

Discussion With the present work, clinical knowledge about predictors of premature treatment drop-out could be expanded. The results indicate that predominantly socially stable patients benefit from the currently established treatment setting. Our results suggest that sports events such as the European Football Championship can trigger unplanned treatment drop-out in male patients. Social and political measures could improve public awareness. In the light of the prevalence of sleep disturbances during detoxification, detoxification treatment should be enriched with individual evaluation of sleep quality and insomnia-specific treatment.

1. EINLEITUNG

Sucht ist eine chronische Erkrankung, die Millionen von Menschen weltweit betrifft. Alkoholabhängigkeit ist das schwerwiegendste und für die Gesellschaft teuerste Gesundheitsproblem in Deutschland [1]. In den Industrieländern gehört Alkoholismus zu den häufigsten Todesursachen [2]. Die qualifizierte Entzugsbehandlung ist der erste Schritt in der stationären Alkohol- und Drogentherapie. Der vorzeitige Behandlungsabbruch ist dabei eine häufige und schwerwiegende Komplikation [3]. Das Rückfallrisiko bestimmt im Wesentlichen die Prognose sowie die Mortalität der Erkrankung [4]. Der vorzeitige Therapieabbruch zeichnet sich in der Regel durch ein ungünstiges langfristiges Behandlungsergebnis aus [5]. Der reguläre Behandlungsabschluss ist ein wesentliches Erfolgskriterium bei der stationären Entgiftungstherapie, da der Therapieabbruch meist von einem Rückfall begleitet wird [6]. In der Literatur finden sich sowohl für alkohol- als auch für drogenabhängige Patienten hohe Abbruchraten während der stationären Entzugsbehandlung. So wurden für alkoholabhängige Patienten irreguläre Therapieabbrüche bei 33% der Patienten berichtet [7], während die Abbruchrate bei drogenabhängigen Patienten mit 50% noch wesentlich höher lag [8]. Für den Behandlungserfolg ist es daher von großer Bedeutung, Determinanten und Risikofaktoren eines irregulären Behandlungsabschlusses zu identifizieren um die qualifizierte Entzugsbehandlung für die Patienten entsprechend adaptieren zu können. Diverse Prädiktoren wurden bereits in vorhergehenden Studien identifiziert. Bei Drogenabhängigkeit erwiesen sich das Bildungsniveau der Patienten, Arbeitslosigkeit und Straffälligkeit als prädiktiv für einen Rückfall [9-11]. Bei Alkoholabhängigkeit waren die Anzahl bisheriger stationärer Entgiftungen, die Schwere der Abhängigkeit und die Psychopathologie signifikante Determinanten für die Art des Behandlungsabschlusses [1,12-13]. Jedoch haben noch keine Studien bisher untersucht, ob auch Faktoren, die jenseits der individuellen Lebensumstände liegen, wie beispielsweise sportliche Großereignisse, einen Einfluss auf das Ergebnis der qualifizierten Entzugsbehandlung ausüben. Dabei sind Sportevents stark mit Alkoholkonsum assoziiert [14]. Marketing für alkoholische Getränke während im Fernsehen übertragener Spiele beeinflusst nachgewiesenermaßen den Alkoholkonsum [15]. Ein weiterer wichtiger Faktor im Zusammenhang mit dem Konsum von Suchtmitteln ist der Schlaf. Der Zusammenhang von Suchterkrankungen und Schlafstörungen ist weitreichend belegt. Studien haben gezeigt, dass Schlafstörungen, die früh im Laufe des Lebens aufgetreten sind, Individuen dazu prädisponieren einen Substanzmissbrauch zu entwickeln [16], während der Substanzmissbrauch wiederum zur Entwicklung von Schlafstörungen beiträgt [17]. Dabei verändert die wiederholte Gabe von Suchtmitteln die Homöostase multipler Neurotransmitter wie Acetylcholin [18], Dopamin, Glutamat [19-20], GABA [21], Norepinephrin [22] und Hypocretin/Orexin [23], was sowohl zu Toleranzentwicklung als auch zu Abhängigkeit führt. Da die zuvor genannten

Neurotransmittersysteme bei der Regulierung des zirkadianen Rhythmus involviert sind [24], treten Schlafstörungen häufig bei Suchterkrankungen auf [25]. Schlafstörungen können wiederum einen Risikofaktor für einen Rückfall darstellen [26].

Ziel der vorliegenden Arbeit war es, Prädiktoren eines vorzeitigen Therapieabbruchs bei Patienten mit Alkohol- und Drogenabhängigkeit zu identifizieren. Hierzu wurden drei prospektive Studien durchgeführt: Im Rahmen der ersten Studie wurden diverse psychosoziale und soziodemographische Determinanten sowie die Behandlungsmotivation und die suchtmmedizinische Vorgeschichte der Patienten analysiert und dabei untersucht, ob sich Unterschiede zwischen den Patienten mit und ohne vorzeitigen Behandlungsabschluss finden lassen. Die zweite Studie untersuchte den Einfluss externer Faktoren auf den Therapieerfolg am Beispiel eines Sportgroßereignisses. Anhand der Erfassung aller Aufnahmen zur qualifizierten Entzugsbehandlung und aller vorzeitigen Entlassungen im Verlauf der Wochen vor, während und nach der UEFA Fußball Europameisterschaft 2012 wurde der Einfluss des Turniers auf den Behandlungsabschluss untersucht. Es sollte die Fragestellung eruiert werden, ob es aufgrund der Fußball Europameisterschaft zu einer Häufung oder gar Senkung von Therapieabbrüchen kam und Sportgroßereignisse als Prädiktoren eines vorzeitigen Therapieabbruchs herangezogen werden können. Ziel der dritten Studie war es, die Schlafqualität von alkoholabhängigen Patienten im Verlauf der stationären qualifizierten Entzugsbehandlung zu beobachten und zu untersuchen, ob die Schlafqualität nach dem physischen Entzug als Prädiktor eines vorzeitigen Therapieabbruchs herangezogen werden kann. Die vorgelegte Arbeit soll dazu beitragen das Risiko eines irregulären Behandlungsabschlusses bei der qualifizierten stationären Entzugsbehandlung alkohol- und drogenabhängiger Patienten zu senken, indem risikobehaftete Variablen identifiziert werden. Durch die Berücksichtigung identifizierter Prädiktoren während der Behandlung und eine entsprechende, patientenindividuelle Anpassung des Behandlungskonzeptes kann das Risiko eines irregulären Behandlungsabschlusses gesenkt und der Therapieerfolg positiv beeinflusst werden.

2. METHODIK

Studie 1 832 Patienten, die zur qualifizierten Entgiftungsbehandlung in der psychiatrischen Klinik des Jüdischen Krankenhauses in Berlin vorstellig wurden, konnten in die prospektive Studie eingeschlossen werden. Patienten, die aufgrund psychiatrischer oder organischer Störungen keine Einwilligungserklärung zur Teilnahme abgeben konnten, wurden von der Teilnahme ausgeschlossen. Neben soziodemographischen und psychosozialen Variablen wie Alter, Geschlecht, Familienstand, Bildungsstatus und Beruf wurden Daten zur Therapie-motivation und Suchtanamnese hinsichtlich eines irregulären beziehungsweise regulären Behandlungsabschlusses untersucht. Als irregulärer Behandlungsabschluss wurden sowohl der vorzeitige Therapieabbruch auf Wunsch des Patienten gegen ärztlichen Rat sowie

disziplinarische Entlassung aufgrund von Nichteinhaltung von Therapieregeln (wie Alkohol- oder Substanzkonsum) bewertet. Die qualifizierte Entzugsbehandlung wurde im Rahmen eines einheitlichen Therapiekonzeptes in drei Schritten durchgeführt und umfasste den Substanzenzug, psychotherapeutische Gruppentherapien sowie die Etablierung eines Nachsorgekonzeptes um die Weiterbehandlung nach Entlassung aus dem Krankenhaus sicherzustellen. Das multiprofessionelle Behandlungsteam setzte sich aus Ärzten, Psychologen, Krankenpflegern, Ergotherapeuten, Physiotherapeuten und Sozialarbeitern zusammen. Die durchschnittliche Behandlung betrug je nach therapeutischen Erfordernissen zwölf bis sechzehn Tage, konnte aber bei anhaltenden Entzugssymptomen auch mehrere Wochen betragen. Wenn individuell erforderlich, erfolgte beim Alkoholentzug eine symptomatische, medikamentöse Behandlung der Entzugssymptome mit Clomethiazol (Distraneurin). Opiatentzugssymptome wurden mit L-Polamidon in absteigender Dosierung behandelt. Der Entzug von Cannabis, Amphetaminen und Kokain erfolgte ohne medikamentöse Begleitung. Zur Ermittlung des Schweregrades der Alkoholentzugssymptome wurde die CIWA-Skala (Clinical Institute Withdrawal Assessment for Alcohol, Sullivan et al. [27]) herangezogen. Die Datenerhebung erfolgte im Rahmen der semi-strukturierten Aufnahmegespräche mit den Patienten. Sämtliche Diagnosen wurden nach DSM-IV Kriterien gestellt. Die Datenauswertung erfolgte mit der SAS-Software (Statistical Analysis System; SAS Institute) Version 9.4 und alle Variablen wurden auf signifikante Unterschiede zwischen Patienten mit und ohne vorzeitigem Therapieabbruch untersucht. Hierbei wurde das Signifikanzlevel auf $p \leq 0,05$ gesetzt. Darüber hinaus wurden logistische Regressionsanalysen für vier Variablencluster (1. sozio-demografische Determinanten, 2. motivations- und suchtasoziierte Determinanten, 3. Impulsivitätsmerkmale und 4. Determinanten aus der medizinischen Anamnese) zur Identifizierung signifikanter Prädiktoren eines vorzeitigen Therapieabschlusses modelliert. Eine ausführliche Beschreibung der statistischen Analysen kann den angefügten Originalarbeiten entnommen werden.

Studie 2 In die prospektiv konzipierte Studie wurden 125 konsekutiv zur qualifizierten Entgiftungsbehandlung aufgenommene Patienten mit Alkoholabhängigkeit eingeschlossen. Wiederum wurden Patienten, die aufgrund psychiatrischer oder organischer Störungen keine Einwilligungserklärung zur Teilnahme geben konnten, von der Teilnahme ausgeschlossen. Die Therapiebedingungen des qualifizierten Entzuges entsprachen den Bedingungen der Studie 1. Vor Studienbeginn wurden alle Teilnehmer über das Behandlungskonzept der qualifizierten Entzugsbehandlung und die durchschnittliche Behandlungsdauer unterrichtet. Es wurde untersucht, ob die UEFA Fußball Europameisterschaft 2012 einen Einfluss auf den Therapieerfolg hatte, beziehungsweise ob es in Folge des Turnieres zu einer Erhöhung der Therapieabbruchquote kam. Um den Einfluss der Europameisterschaft auf den Therapieerfolg zu untersuchen, wurden vier zu vergleichende Perioden definiert. Hierdurch sollte sichergestellt

werden, dass Patienten, die aufgrund der UEFA Fußball Europameisterschaft die Behandlung vorzeitig abbrechen von jenen differenziert werden können, die die Entzugstherapie unabhängig von der Fußballmeisterschaft irregulär beendeten. Aufgrund der durchschnittlichen Behandlungsdauer von vierzehn Tagen wurde eine Periodendauer von 13 Tagen festgelegt. Periode I umfasste die Tage 26 bis 13 vor der UEFA-Europameisterschaft 2012. Periode II umfasste die Tage 13 bis 0 vor der Meisterschaft. Periode III umfasste das Turnier mit einer Dauer von 24 Tagen, während Periode IV die 13 Tage nach Beendigung der Meisterschaft umfasste. Die Patienten, die in den Perioden II und III zur Entzugsbehandlung stationär aufgenommen wurden, wurden als abbruchgefährdet eingestuft, da sie Turniertage aufgrund des stationären Aufenthaltes verpassten. Patienten, die in den Perioden I und IV aufgenommen wurden, galten als nicht abbruchgefährdet, da sie die Behandlung regulär vor Beginn beziehungsweise nach der UEFA-Europameisterschaft beenden konnten. Die Daten wurden anhand von zwei Patientengruppen ausgewertet: Die erste Gruppe bestand aus allen Patienten, die in den vier Perioden zur qualifizierten Entgiftungstherapie aufgenommen wurden, wohingegen sich die zweite Gruppe aus allen in den vier Perioden entlassenen Patienten zusammensetzte. Die Datenanalysen wurden mit Version 9.4 der Statistical Analysis System (SAS) Software durchgeführt. Das Signifikanzniveau wurde bei $p \leq 0,05$ angesetzt.

Studie 3 Anhand der Variablen Geschlecht, Alter, Abhängigkeitsdauer, Therapieabschluss (regulär versus irregulär), Schlafqualität bei Aufnahme und Schlafqualität bei Entlassung sollte untersucht werden, welchen Einfluss die subjektive Schlafqualität der Patienten während der qualifizierten Entzugsbehandlung auf den Behandlungsabschluss hat und ob schlechter Schlaf als Prädiktor eines vorzeitigen Therapieabbruchs herangezogen werden kann. Das Therapiesetting entsprach wiederum den Bedingungen der Studien 1 und 2. Zur Bestimmung der Schlafqualität von 77 in die Studie eingeschlossenen Patienten mit Alkoholabhängigkeit wurde der Pittsburgh Sleep Quality Index (PSQI) nach Buysse et al. [28] angewendet. Es handelt sich dabei um einen Fragebogen zur retrospektiven Erfassung der subjektiven Schlafqualität, anhand dessen Schlafdauer, schlafstörende Ereignisse, Einschlaf latenz, der Gebrauch von Schlafmedikation und Tagesmüdigkeit in den letzten vier Wochen vor Entgiftung abgefragt wurde. Der PSQI-Fragebogen wurde frühestens nach Abschluss des physischen Entzuges und ein zweites Mal nach Abschluss der Behandlung kurz vor der Entlassung ausgefüllt. Der zweite Fragebogen erfasste dabei die Schlafqualität während des stationären Aufenthaltes. Das Ergebnis des Fragebogens, der PSQI-Score, kann einen Wert zwischen 0 und 21 erreichen, wobei eine höhere Ausprägung einer verringerten subjektiven Schlafqualität entspricht. Ein PSQI-Score von mehr als fünf Punkten wurde als Indikator für schlechten Schlaf herangezogen. Bei 38 Patienten war eine Behandlung der Alkoholentzugssymptome mit Clomethiazol erforderlich. Clomethiazol zeichnet sich durch eine kurze Eliminationshalbwertszeit von drei Stunden aus und wurde als Entzugsmedikation gewählt um die Ergebnisse

der Studie möglichst wenig zu beeinflussen. Auf die Gabe von Benzodiazepinen wurde verzichtet. Patienten, die unvollständige Angaben machten, oder nur einen der zwei PSQI-Bögen ausfüllten, wurden aus der Analyse ausgeschlossen. Die Veränderungen der Schlafqualität zwischen Aufnahme und Entlassung wurden bestimmt und statistisch bewertet (eine detaillierte Beschreibung der statistischen Methoden kann den angefügten Originalarbeiten entnommen werden). Die Analysen wurden mit der Statistical Analysis System (SAS) Software, Version 9.4 durchgeführt. p-Werte $\leq 0,05$ wurden als statistisch signifikant erachtet.

3. ERGEBNISSE

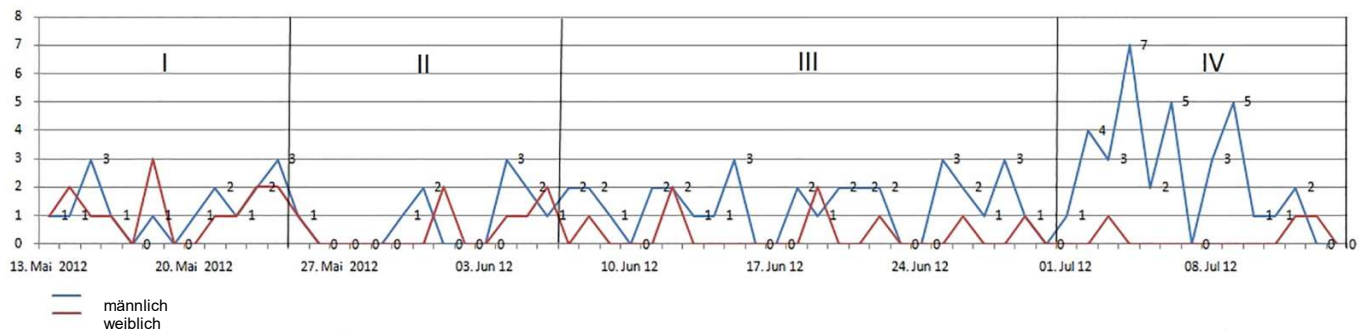
Studie 1 832 Suchtpatienten konnten für die Studie rekrutiert werden. 74% (619) waren männlich, 26% (213) waren weiblich. Das Durchschnittsalter betrug 44 (± 13) Jahre. Die Kohorte zeichnete sich durch einen hohen Anteil von alleinstehenden Patienten (60,3%) aus. Knapp die Hälfte der Patienten (45,2%) war sozialhilfeabhängig und jeder zehnte (12,3%) Patient obdachlos. Aus der gesamten analysierten Gruppe brachen 307 (36,9%) der Patienten die Behandlung vorzeitig ab, 249 (81,1%) davon auf eigenen Wunsch. Ein Vergleich der Therapieabbrecher mit den nicht-abbrechenden Patienten zeigt, dass diese signifikant jünger waren ($p = 0,0001$) und Männer häufiger abbrachen als Frauen ($p = 0,0365$). In der vorliegenden Studie zeigten alle getesteten soziodemographischen Variablen einen signifikanten Einfluss auf das Behandlungsergebnis. Weibliches Geschlecht ($p = 0,0365$), eine Partnerschaft ($p = 0,0020$), Berufstätigkeit ($p = 0,0001$), gute Bildung ($p = 0,0001$), Deutsch als Muttersprache ($p = 0,0041$) sowie Elternschaft ($p = 0,0026$) waren Prädiktoren für einen regulären Behandlungsabschluss. Die Untersuchung der Behandlungsmotivation ergab, dass diejenigen Patienten, die Familie ($p = 0,0093$), Gesundheit ($p = 0,0031$), die Angst vor dem Verlust des Arbeitsplatzes ($p = 0,0435$), ein aktuell anhängiges Strafverfahren ($p = 0,0184$) oder eine Noteinweisung ($p = 0,0285$) ins Krankenhaus als Behandlungsmotivation angaben, signifikant häufiger die Behandlung regulär beendeten. Bei den suchtspezifischen Parametern zeigte sich, dass Patienten ohne vorherige Entgiftungsbehandlung ($p = 0,0002$) und Patienten ohne vorherige Behandlungsabbrüche ($p = 0,0001$) signifikant häufiger die qualifizierte Entzugsbehandlung regulär beendeten. Die Dauer der längsten Abstinenzperiode war für einen vorzeitigen Behandlungsabbruch nicht prädiktiv ($p = 0,0874$). Mit der logistischen Regressionsanalyse konnte errechnet werden, dass Patienten mit ein oder zwei vorhergehenden vorzeitigen Therapieabschlüssen ein 4,7-fach erhöhtes Risiko (95%-CI: 2, 9; 7, 4) und Patienten mit drei oder mehr vorhergehenden vorzeitigen Therapieabschlüssen ein 10,4-faches Risiko (95%-CI: 4, 0; 27, 6) für einen irregulären Behandlungsabschluss tragen. Als prädiktiv hinsichtlich eines irregulären Behandlungsabschlusses erwiesen sich unter den persönlichkeitsassoziierten Variablen Aggressivität ($p = 0,0082$), Gewalterfahrungen ($p = 0,0475$), intravenöser Drogenkonsum ($p = 0,0001$) und Inhaftierung ($p = 0,0001$).

Suizidversuche in der Anamnese hingegen beeinflussten den Behandlungsabschluss nicht signifikant ($p = 0,5113$). Auch diese Ergebnisse wurden durch die logistische Regressionsanalyse verifiziert. Insbesondere Patienten ohne Strafverfolgung in der Vorgeschichte (OR: 0,50; 95%-CI: 0,33; 0,76) und ohne intravenösen Drogenkonsum (OR: 0,45; 95%-CI: 0,30; 0,69) hatten ein deutlich reduziertes Risiko für einen vorzeitigen Behandlungsabschluss. Auch die medizinische Vorgeschichte der Patienten wurde erfasst und auf potentielle Prädiktoren untersucht. Das Vorliegen einer im Laufe der Suchterkrankung erworbenen Infektion ($p = 0,0145$) oder von Störungen des zentralen Nervensystems ($p = 0,0416$) war prädiktiv für das Behandlungsergebnis. Erkrankungen des Magen-Darm-Traktes ($p = 0,0554$) oder Schäden des peripheren Nervensystems ($p = 0,7909$) hingegen waren nicht prädiktiv für den Behandlungsabschluss. Das Vorliegen einer zusätzlichen, nicht suchtbefindlichen Diagnose zeigte in unserer Studie hingegen einen deutlich positiven Einfluss auf den Behandlungsabschluss ($p = 0,0001$). Zudem erwies sich die Suchtdiagnose, respektive das Suchtmittel, als prädiktiv für den Behandlungsabschluss. In unserer Studie beendeten Patienten mit der Diagnose Alkoholabhängigkeit oder pathologischem Spielen die Behandlung in 70% bzw. 100% der Fälle regulär. Im Gegensatz dazu haben mehr als die Hälfte der Patienten mit Cannabis-, Opiat- oder multiplem Substanzgebrauch die Behandlung abgebrochen. Als Determinanten waren hierbei die erste ($p = 0,0001$) und die zweite Suchtdiagnose ($p = 0,0045$) relevant, nicht aber, um welche Sucht es sich bei der dritten Diagnose handelte ($p = 0,0865$). Anhand der logistischen Regressionsanalyse konnte bestätigt werden, dass das alleinige Vorliegen einer Suchterkrankung ohne zusätzliche nicht-suchtassoziierte Diagnose das Risiko eines vorzeitigen Behandlungsabschlusses verdoppelte (OR 2,07, 95% OR: 1,50 - 2,86; $p < 0,001$). Darüber hinaus zeigte sich, dass Drogenpatienten, nicht aber Alkoholpatienten, ein signifikant erhöhtes Risiko eines vorzeitigen Therapieabschlusses hatten: Opiatabhängigkeit erhöhte das Risiko um das 3,2-fache (95% OR: 1,98 - 5,25), während Cannabis-, Hypnotika- oder Kokainabhängigkeit sowie polytoxikomaner Drogenkonsum das Risiko eines irregulären Behandlungsabschlusses verdoppelte (OR 2,12, 95% OR: 1,40 - 3,21).

Studie 2 Für die Untersuchung des Einflusses der Fußball-Europameisterschaft 2012 auf den Behandlungsabschluss alkoholabhängiger Patienten konnten 125 Patienten im mittleren Alter von 45,5 ($\pm 11,9$) Jahren in die Studie eingeschlossen werden. 93 (74,4%) der Patienten waren männlich, 32 (25,6%) waren weiblich. Insgesamt beendeten 93 (74,4%) der während der vier beobachteten Perioden zur Entgiftungstherapie aufgenommenen Patienten die Behandlung planmäßig, während 32 (27,8%) Patienten die Behandlung abbrachen. Die Abbrecher unterschieden sich dabei weder hinsichtlich des mittleren Alters ($p = 0,6760$), noch hinsichtlich des Geschlechtes ($p = 0,5712$) signifikant von den Patienten, die die Behandlung erfolgreich beendeten. In den vier beobachteten Perioden wurden 116 Patienten (mittleres Alter 46,5 $\pm 11,9$ Jahre) entlassen. Hier betrug die Abbruchquote 30,2% ($N = 35$). Wie zuvor bei den

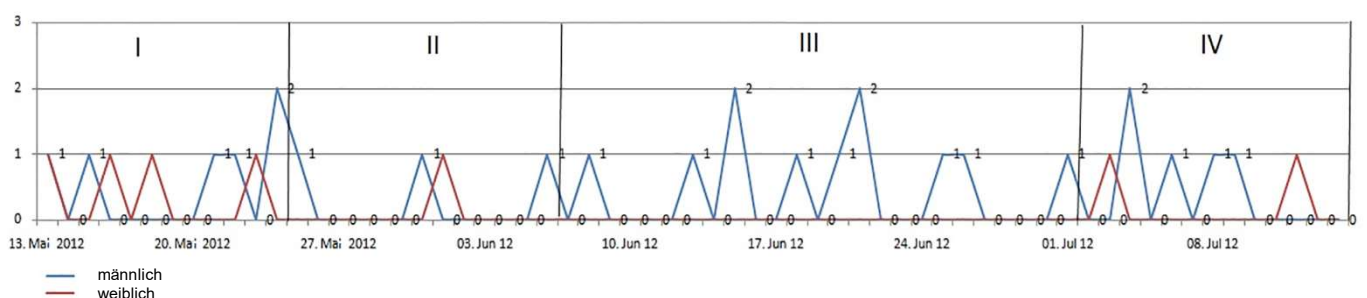
Aufnahmen unterschied sich das Durchschnittsalter der Patienten, die die Behandlung regulär abgeschlossen hatten, nicht signifikant vom Durchschnittsalter der Patienten mit vorzeitigem Behandlungsabbruch. Sowohl die Aufnahmen als auch die Therapieabbrüche wurden für die vier zuvor definierten Perioden aufgezeichnet. Für beide Geschlechter zeigte sich in den ersten drei Perioden ein schwankender Verlauf mit ähnlichen Aufnahmemustern. Nach der Europameisterschaft (Periode IV) war ein signifikanter Anstieg der Aufnahmen männlicher Patienten zu beobachten ($p = 0,0295$, Abbildung 1).

Abbildung 1: Tägliche Aufnahmen zur qualifizierten Entgiftungsbehandlung vor (I und II), während (III) und nach (IV) der Fußball-Europameisterschaft 2012



Auch die vorzeitigen Behandlungsabbrüche wurden im Verlauf der vier Perioden analysiert. Wie bei den Aufnahmen zeigte sich ein schwankender Verlauf, jedoch ohne besondere Auffälligkeiten (Abbildung 2).

Abbildung 2: Tägliche Therapieabbrüche vor (I und II), während (III) und nach (IV) der Fußball-Europameisterschaft 2012



Für die vier Perioden wurde jeweils die durchschnittliche Anzahl der täglichen Aufnahmen und Therapieabbrüche berechnet (Tabelle 1). In den Perioden II und III, das heißt in den zwei Wochen vor und während der Fußball-Europameisterschaft, sank die Aufnahmerate verglichen mit den Perioden I und IV deutlich ab. Dabei zeigte sich, dass sich die durchschnittliche Aufnahmerate bei den weiblichen Patienten im Verlauf der vier Perioden nicht signifikant unterschied ($p = 0,2745$), wohl aber bei den männlichen Patienten ($p = 0,0295$). Ebenso wurde die durchschnittliche Rate vorzeitiger Therapieabbrüche pro Tag berechnet. In der ersten Periode zeigte sich eine erhöhte Abbruchrate verglichen mit den anderen drei Perioden.

Betrachtet man hier die beiden Geschlechter getrennt, zeigt sich für die männlichen Patienten kein Unterschied zwischen den durchschnittlichen Abbruchraten in den vier Perioden ($p = 0,7821$). Bei den weiblichen Patienten hingegen erhöhte sich die Abbruchrate signifikant in der ersten Periode ($p = 0,0122$).

Tabelle 1: Anzahl der täglichen Aufnahmen und Therapieabbrüche pro Periode

Periode	Periodendauer [Tage]	Aufnahmen zur qualifizierten Entzugsbehandlung pro Tag	Therapieabbrüche pro Tag
I	13	1,8	0,8
II	13	1,0	0,5
III	24	1,2	0,5
IV	13	2,0	0,5

Studie 3 77 alkoholabhängige Patienten wurden in die Studie eingeschlossen. Das mittlere Alter betrug 47,7 ($\pm 12,2$) Jahre mit einem deutlich höheren Männer- (76,6%) als Frauenanteil (23,4%). Bei 38 Patienten (49,4%) war eine Behandlung der Entzugssymptomatik mit Clomethiazol (Distraneurin) notwendig. Fünf Patienten (6,5%) brachen die Behandlung vorzeitig ab. Bei Aufnahme litten 54 (70,1%) der Patienten unter schlechtem Schlaf, was sich an einem PSQI-Wert > 5 zeigte. Der mittlere PSQI-Wert der Kohorte betrug 9,1 ($\pm 4,6$) bei der Aufnahme zur qualifizierten Entzugsbehandlung und fiel bei der Entlassung auf 7,1 ($\pm 3,6$), das heißt, die Schlafqualität der Kohorte verbesserte sich signifikant um $2,0 \pm 4,8$ Punkte ($p = 0,0006$), dies entspricht einer Verbesserung um 22%. Bei Entlassung lag der Anteil an Patienten mit schlechter Schlafqualität noch bei 59,7% ($N = 46$). Betrachtet man dieses Ergebnis im Detail, zeigte sich bei 61,0% der Patienten eine Verbesserung der subjektiven Schlafqualität, während sich bei 23,4% der Studienteilnehmer der Schlaf verschlechterte. Bei 15,6% der Patienten änderte sich die Schlafqualität im Behandlungsverlauf nicht. Die univariante Analyse der Variablen Geschlecht, Behandlungsabschluss (regulär versus irregulär) und Dauer der Abhängigkeit zeigte keinen signifikanten Einfluss der Merkmale auf die Schlafqualität, weder bei der Aufnahme, noch bei der Entlassung. Mittels Regressionsanalyse wurde untersucht, ob das Alter der Patienten als Determinante der Schlafqualität während der Entzugsbehandlung herangezogen werden kann. Es zeigte sich kein signifikanter Einfluss des Alters auf die Schlafqualität, unabhängig vom Alter verbesserte sich der Schlaf durchschnittlich um zwei Punkte ($p = 0,8785$, Abbildung 3).

Abbildung 3: Regressionsanalyse des Einflusses vom Alter auf die Schlafqualität während der stationären Entzugsbehandlung. Regression: $\Delta\text{PSQI} = -2.3 + 0.007 \cdot \text{Alter}$ ($p = 0,8785$; $R^2 = 0,0003$)

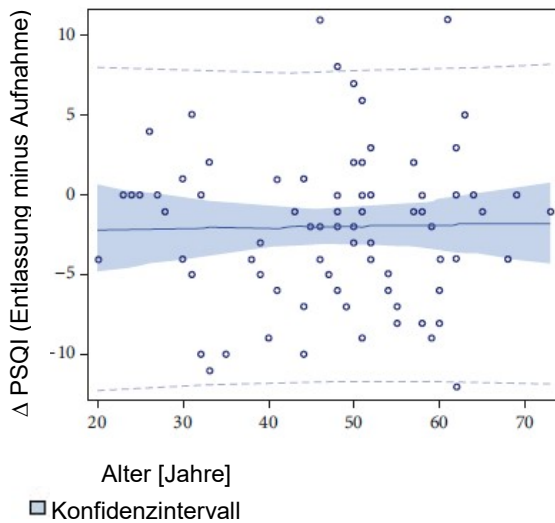
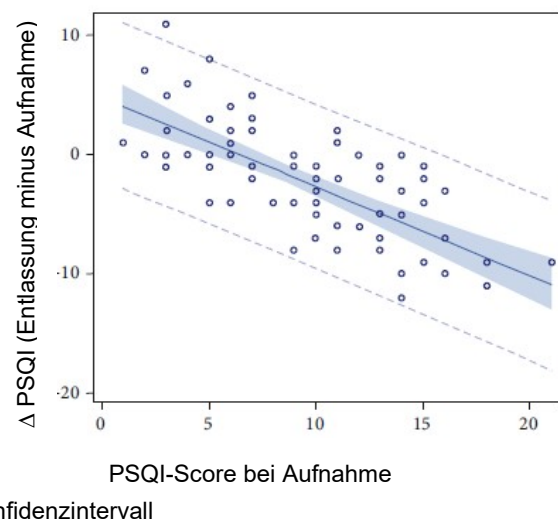


Abbildung 4: Regressionsanalyse des Einflusses des PSQI-Wertes bei Aufnahme auf die Veränderung der Schlafqualität während der Entzugsbehandlung. Regression: $\Delta\text{PSQI} = 4,9 - 0,752 \cdot \text{PSQI bei Aufnahme}$ ($p < 0,0001$; $R^2 = 0,5096$)



Als bedeutsam hinsichtlich der Schlafqualität erwies sich der PSQI-Score bei Aufnahme. Bei Patienten mit sehr schlechtem Schlaf vor der Aufnahme verbesserte sich der Schlaf signifikant im Verlauf der Behandlung ($p < 0,0001$, Abbildung 4). Bei Patienten, die bei Aufnahme keine oder nur geringfügig ausgeprägte Schlafstörungen vorwiesen, veränderte sich der Schlaf hingegen gar nicht bis geringfügig. Der Prädiktor PSQI-Score bei Aufnahme wurde mit Hilfe der Berechnung des General Linear Models mit einem Signifikanzlevel von $p < 0,0001$ abschließend bestätigt.

4. DISKUSSION

Die vorliegende Arbeit sollte dazu beitragen, Determinanten eines vorzeitigen Abbruchs der stationären qualifizierten Entzugsbehandlung bei alkohol- und drogenabhängigen Patienten zu identifizieren. Zusammenfassend konnten folgende Determinanten bestimmt werden: Jüngerer Alter, männliches Geschlecht, alleinstehend sein, Kinderlosigkeit, niedriges Bildungsniveau, Arbeitslosigkeit, Straffälligkeit, intravenöser Drogenkonsum und insbesondere eine hohe Anzahl vorhergehender Therapieabbrüche waren prädiktiv für einen vorzeitigen Behandlungsabbruch. Ein stabiles soziales Umfeld, Erwerbstätigkeit, ein hohes Bildungsniveau und ein geringer Schweregrad der Abhängigkeitserkrankung hingegen konnten als Prädiktoren für einen regulären Behandlungsabschluss identifiziert werden. Hinsichtlich des Einflusses externer Ereignisse auf den Therapieerfolg konnte am Beispiel der UEFA Fußball Europameisterschaft 2012 die Hypothese einer Assoziation von vorzeitigen Therapieabbrüchen mit dem Fußballturnier mit unseren Ergebnissen in Einklang gebracht werden. Die Untersuchung der subjektiven Schlafqualität während der qualifizierten Entzugsbehandlung zeigte, dass anhand

der Schlafqualität bei Aufnahme die Schlafqualität bei Entlassung vorhergesagt werden kann. Entgegen unseren Erwartungen erwies sich die Schlafqualität während des Entzuges jedoch nicht als prädiktiv für einen irregulären Behandlungsabschluss.

Studie 1 Die Studie zeigte, dass drogenabhängige Patienten im Vergleich zu alkoholabhängigen Patienten ein erhöhtes Risiko eines vorzeitigen Behandlungsabbruchs tragen. Frühere Untersuchungen bestätigen diese Ergebnisse. Braune et al. [9] beschrieben Abbruchquoten von 43,3% für alkoholabhängige Patienten, beziehungsweise von 62,4% für drogenabhängige Patienten. Alle Patienten, die zur Behandlung ihrer Spielsucht an der Studie teilnahmen, beendeten die Therapie regulär. Dieses Ergebnis ist jedoch nur begrenzt aussagekräftig, da an der vorliegenden Studie nur vier Patienten zur Behandlung des pathologischen Spielens teilnahmen. Weibliches Geschlecht erwies sich als Prädiktor für einen regulären Behandlungsabschluss. Andere Studien hingegen kamen zu gegenteiligen Ergebnissen, bei dem die Abbruchquoten für Männer und Frauen entweder gleich waren [29] oder Abbrüche bei Frauen häufiger auftraten als bei Männern [30]. Die in unsere Studie inkludierten weiblichen Patienten waren im Vergleich zu den männlichen Patienten höher qualifiziert und häufiger erwerbstätig. Schlussfolgernd scheint ein intaktes soziales Netzwerk den Verlauf der Entgiftungstherapie positiv zu unterstützen. Patienten mit guter Bildung und einem Arbeitsplatz leben unter sozial und wirtschaftlich besseren Bedingungen und es ist wahrscheinlich, dass sie hierdurch über ein größeres soziales Netzwerk und eine etablierte Tagesstruktur verfügen. Beides wirkt sich positiv auf den Therapieverlauf aus. Dass Patienten mit Kindern eine bessere Prognose haben erscheint insofern sinnvoll, als dass die Verantwortung, die sie als Eltern gegenüber ihren Kindern tragen, sich positiv auf die Therapiemotivation ausgewirkt haben dürfte. Diese Beobachtung steht weiterhin mit der Feststellung im Einklang, dass Familie als Therapiemotivation ein signifikanter Prädiktor für ein positives Behandlungsergebnis war. Arbeitslosigkeit, Straffälligkeit und intravenöser Drogenkonsum erwiesen sich hingegen als prädiktiv für einen vorzeitigen Therapieabbruch. Straffällige Patienten leben in instabilen und nicht unterstützenden sozialen Netzwerken, was sich negativ auf den Verlauf ausgewirkt haben dürfte. Wie erwartet, konnte ein negativer Zusammenhang zwischen den Determinanten Gewalt und Aggressivität und dem Behandlungsergebnis gezeigt werden. Daten aus der Literatur deuten darauf hin, dass 20% bis 40% aller Erwachsenen in der Kindheit oder Jugend häuslicher Gewalt ausgesetzt waren [31]. Familiäre Probleme wie häusliche Gewalt und psychische Erkrankungen der Eltern wiederum stellen Risikofaktoren für psychische Erkrankungen und soziale Probleme dar [32]. Darüber hinaus waren Inhaftierung und intravenöser Drogenkonsum hoch signifikante Prädiktoren für einen vorzeitigen Therapieabbruch. Beide Attribute deuten auf einen schweren Krankheitsverlauf hin, welcher einem positiven Behandlungsverlauf entgegensteht. Ein längerer stationärer Aufenthalt und die gleichzeitige Fernhaltung der Patienten von ihrem sozialen

Umfeld könnte die Chancen auf einen regulären Behandlungsabschluss erhöhen. Patienten ohne vorherige Entgiftungstherapien und ohne vorhergehende Therapieabbrüche schlossen die stationäre Behandlung deutlich häufiger ab als Patienten mit vorhergehenden Entgiftungstherapien und Abbrüchen. Unsere Ergebnisse gleichen den Ergebnissen von Wagner et al. [33], die einen starken negativen Einfluss auf die Abstinenzwahrscheinlichkeit in Abhängigkeit von der Anzahl der stationären Entgiftungen fanden. Es ist davon auszugehen, dass vorzeitige Therapieabbrüche und wiederholte Entgiftungen die Selbstwirksamkeit der Patienten schwächen und damit die Hemmschwelle für erneutes sich in Behandlung begeben erhöht wird. Das Vorliegen einer im Laufe der Suchterkrankung erworbenen Infektion, Erkrankung des zentralen Nervensystems sowie einer zusätzlichen, nicht sucht-bezogenen Diagnose zeigten in unserer Studie einen deutlich positiven Einfluss auf den Behandlungsabschluss. Schlussfolgernd kann angenommen werden, dass der verminderte Gesundheitszustand und die resultierende kurative Behandlung und Hinwendung zum Patienten durch das Ärzte- und Pflegepersonal als zusätzlicher Motivations- und Unterstützungsfaktor für den Behandlungserhalt dienen. Die Ergebnisse dieser Studie deuten darauf hin, dass vor allem Patienten aus sozial und ökonomisch stabilen Verhältnissen vom aktuellen Behandlungssetting profitieren und die Behandlung für Patienten mit instabilem Umfeld hinsichtlich Art, Dauer und Intensität entsprechend adaptiert werden sollte.

Studie 2 25,6% der während der Studie zur Entgiftungsbehandlung aufgenommenen Patienten brachen die Therapie vorzeitig ab, wohingegen 30,2% der während der Studie entlassenen Patienten die Behandlung irregulär beendeten. Diese Ergebnisse konvergieren mit Daten aus anderen Studien, in denen Abbruchquoten zwischen 30% und 44% für alkoholabhängige Patienten beschrieben wurden [7,9]. Sowohl der Verlauf der Aufnahmen, als auch der vorzeitigen Entlassungen zeigte über die vier Perioden hinweg deutliche Schwankungen. Diese kamen durch die Pfingstfeiertage und die Wochenenden zu Stande, da hier keine Patienten stationär aufgenommen wurden. Darüber hinaus konnte ein signifikanter Anstieg bei den Aufnahmen männlicher Patienten nach Beendigung der UEFA Fußball-Europameisterschaft festgestellt werden. Diese Ergebnisse deuten darauf hin, dass die Patienten die Entgiftungsbehandlung aufgeschoben haben könnten um das Turnier (und den damit mutmaßlich verbundenen Alkoholkonsum) nicht zu verpassen. Es ist ferner denkbar, dass bisher abstinente Patienten infolge der stark ausgeprägten Assoziation von Fußball und Alkoholkonsum rückfällig wurden. Zum einen haben weltweite Untersuchungen die zunehmende Verbreitung von sportbezogenem Alkoholmarketing gezeigt [15], zum anderen wird der Konsum alkoholischer Getränke häufig mit Sport assoziiert [34], da der Bierkonsum für viele Zuschauer ein fester Bestandteil beim Anschauen von Fußballspielen ist. Bei weiblichen Patienten hingegen konnte bezüglich der Aufnahmen zur Entgiftungsbehandlung und dem Turnier kein Zusammenhang festgestellt werden. Keine Patientin beendete die Behandlung

während der Fußball-Europameisterschaft vorzeitig. Diese Beobachtung lässt die Schlussfolgerung zu, dass die Fußball-Europameisterschaft für weibliche Patienten von weniger Interesse gewesen sein könnte und das Turnier daher keine Motivation für einen vorzeitigen Behandlungsabbruch darstellte. Die für die weiblichen Patienten beobachtete erhöhte Abbruchquote in der ersten Periode war vermutlich eher durch die Pfingstfeiertage als durch das Fußballturnier begründet. In die vorliegende Studie konnten allerdings nur 32 Patientinnen eingeschlossen werden, was die Verallgemeinbarkeit des Befundes einschränkt. Um unsere Befunde zu verifizieren sollten weitere Untersuchungen zum Einfluss von Sportgroßereignissen auf die Wahrscheinlichkeit eines vorzeitigen Behandlungsabschlusses durchgeführt werden. In Anbetracht der oben geschilderten Ausführungen ist denkbar, dass Sportgroßereignisse bei männlichen Patienten als Determinanten vorzeitiger Therapieabbrüche herangezogen werden können.

Studie 3 70% der Patienten berichteten über Schlafstörungen bei der Aufnahme zur qualifizierten Entgiftungsbehandlung. Dieser Befund entspricht unseren Erwartungen, da entsprechende Zahlen in der Literatur beschrieben wurden. Roncero et al. [35] berichteten bei 71% der zur Alkoholentgiftung aufgenommenen Patienten von Schlaflosigkeit, während Escobar-Córdoba et al. [36] sogar bei 89% der Männer bzw. 100% der Frauen Schlaflosigkeit beobachteten. Bei Entlassung persistierten Schlafstörungen noch bei 59,7% der Patienten, was sich dadurch erklären lässt, dass die Entgiftung in einem frühen Stadium des langen Behandlungs- und Genesungsprozesses stattfindet, Schlafprobleme jedoch über die ersten Wochen der Abstinenz hinaus anhalten. Es kann davon ausgegangen werden, dass im weiteren Verlauf eine Verbesserung zu beobachten gewesen wäre, da die Dauer der Entgiftungsbehandlung von zwei Wochen nicht lang genug war, um eine Verbesserung des Schlafes zu beobachten. Dennoch verbesserte sich die Schlafqualität der Kohorte signifikant. Anhand der vorliegenden Befunde können wir davon ausgehen, dass Patienten im Verlauf des Krankenhausaufenthaltes eine regelmäßige Tagesstruktur und einen normalen Tag-Nacht-Rhythmus wiedererlernt haben. Der Verlust von ebendiesem stellt für viele Patienten ein zentrales Symptom der Suchterkrankung dar. In der vorliegenden Studie konnte kein Geschlechterunterschied bezüglich der Schlafqualität beobachtet werden. Hierzu publizierte Daten sind inkonsistent. Die Ergebnisse früherer Untersuchungen von Kolla et al. [37] stehen im Einklang mit unseren Ergebnissen, während Brower et al. [38] zu dem Ergebnis kamen, dass Schlaflosigkeit durch weibliches Geschlecht vorhergesagt wurde. In der Allgemeinbevölkerung wiederum tritt Schlaflosigkeit bei Frauen häufiger auf als bei Männern [39-40]. Interessanterweise fanden sich keine signifikanten Unterschiede bei der Reduktion des PSQI-Scores nach der Entgiftung zwischen Patienten mit regulärem und irregulärem Behandlungsabschluss. Dies könnte an der geringen Abbruchquote liegen, die in der vorliegenden Studie mit nur 6,5% bemerkenswert niedrig ausfiel. In der Literatur werden für

alkoholabhängige Patienten weitaus höhere Abbruchquoten berichtet [7,30]. Diese Diskrepanz könnte darauf zurückzuführen sein, dass es sich bei den Teilnehmern der Studie vor allem um hochmotivierte Patienten handelte. Es ist davon auszugehen, dass sich Patienten mit hohem Risiko für einen vorzeitigen Therapieabbruch, beispielsweise aufgrund fehlender Therapiemotivation oder verminderter Frustrationstoleranz, erst gar nicht zur Teilnahme an der Studie bereit erklärt hatten. Darüber hinaus füllten viele Therapieabbrecher nicht den zweiten PSQI-Bogen aus und mussten daher aus der Datenauswertung ausgeschlossen werden. Weder die Dauer der Abhängigkeit, noch das Alter der Patienten konnten in unserer Untersuchung als Determinanten eines vorzeitigen Therapieabbruchs herangezogen werden. Es kann davon ausgegangen werden, dass altersassoziierte Faktoren wie Lebenserfahrung und fundiertes Wissen über die eigene Suchterkrankung die Patienten nicht dazu befähigt haben die Schlafqualität zu beeinflussen, beziehungsweise Schlafstörungen zu tolerieren. Als einziger Prädiktor für die Schlafqualität während der qualifizierten Entzugsbehandlung konnte der PSQI-Score bei Aufnahme identifiziert werden. Die Ausprägung der Schlafstörungen könnte als Hinweis auf den Schweregrad der Suchterkrankung verstanden werden und somit auch als Indikator für die zu erwartenden Schlafstörungen während der stationären Entzugsbehandlung.

Schlussfolgerung Anhand der vorliegenden Arbeit konnten die Kenntnisse über Determinanten eines vorzeitigen Therapieabbruchs erweitert werden. Die Ergebnisse deuten darauf hin, dass vorwiegend sozial stabile Patienten vom derzeit etablierten Behandlungssetting profitieren. Für Patienten mit negativen Prädiktoren empfiehlt es sich, die qualifizierte Entzugsbehandlung hinsichtlich Interventionsart, -dauer und -intensität anzupassen um so die Möglichkeit gezielter Interventionen zu schaffen um die Patienten in Behandlung zu halten. Zudem sollten bei Suchtpatienten frühzeitig sozialmedizinisch präventive Maßnahmen ergriffen werden um beispielsweise durch Rehabilitationsbehandlungen die Patienten im Berufsleben zu halten und die Krankheitslast einschließlich ihrer sozialen Folgen verringern zu können. Unsere Untersuchungen legen nahe, dass mit Alkoholkonsum assoziierte Sportevents für männliche Patienten ein Auslöser für einen Therapieabbruch sein können. Sozialpolitische Maßnahmen sollten ergriffen werden um die öffentliche Wahrnehmung hinsichtlich des Konsums von Suchtstoffen bei gesellschaftlichen Sportereignissen zu korrigieren, so dass der Konsum von Alkohol zukünftig gesellschaftlich nicht mehr als „normaler“ Bestandteil von Sportevents erachtet wird. In Anbetracht der Prävalenz von Schlafstörungen während des Entzuges erscheint es zudem sinnvoll, das stationäre Behandlungskonzept um Maßnahmen zu erweitern, die sowohl die Erfassung der individuellen Schlafqualität als auch die Behandlung von Schlafstörungen zum Ziel haben. So könnte das Therapieprogramm um Schulungen zur Vermittlung von schlafhygienischen Regeln ergänzt werden.

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6. EIDESSTATTLICHE VERSICHERUNG UND ANTEILSERKLÄRUNG

„Ich, Yvonne Sofin, versichere an Eides statt durch meine eigenhändige Unterschrift, dass ich die vorgelegte Dissertation mit dem Thema: 'Determinanten eines vorzeitigen Therapieabbruchs: Über den Einfluss psychosozialer und soziodemographischer Faktoren, externer Ereignisse sowie subjektiver Schlafqualität während der stationären qualifizierten Entzugsbehandlung bei Patienten mit Alkohol- und Drogenabhängigkeit auf den Therapieerfolg' selbstständig und ohne nicht offengelegte Hilfe Dritter verfasst und keine anderen als die angegebenen Quellen und Hilfsmittel genutzt habe.

Alle Stellen, die wörtlich oder dem Sinne nach auf Publikationen oder Vorträgen anderer Autoren beruhen, sind als solche in korrekter Zitierung kenntlich gemacht. Die Abschnitte zu Methodik (insbesondere praktische Arbeiten, Laborbestimmungen, statistische Aufarbeitung) und Resultaten (insbesondere Abbildungen, Graphiken und Tabellen) werden von mir verantwortet.

Meine Anteile an etwaigen Publikationen zu dieser Dissertation entsprechen denen, die in der untenstehenden gemeinsamen Erklärung mit dem Betreuer angegeben sind. Für sämtliche im Rahmen der Dissertation entstandenen Publikationen wurden die Richtlinien des ICMJE (International Committee of Medical Journal Editors; www.icmje.org) zur Autorenschaft eingehalten. Ich erkläre ferner, dass mir die Satzung der Charité – Universitätsmedizin Berlin zur Sicherung Guter Wissenschaftlicher Praxis bekannt ist und ich mich zur Einhaltung dieser Satzung verpflichte.

Die Bedeutung dieser eidesstattlichen Versicherung und die strafrechtlichen Folgen einer unwahren eidesstattlichen Versicherung (§156,161 des Strafgesetzbuches) sind mir bekannt und bewusst.“

Datum

Unterschrift

ANTEILSERKLÄRUNG AN DEN ERFOLGTEN PUBLIKATIONEN

Yvonne Sofin hatte folgenden Anteil an den vorgelegten Publikationen:

Publikation 1: Sofin Y, Danker-Hopfe H, Gooren T, Neu P. Predicting Inpatient Detoxification Outcome of Alcohol and Drug Dependent Patients: The Influence of Sociodemographic Environment, Motivation, Impulsivity, and Medical Comorbidities, Journal of Addiction, 2017

80%: Eigenständige Erarbeitung des Themas sowie Mitwirkung bei der Erstellung des Studienkonzeptes unter Supervision von Dr. Peter Neu; Erstellung der Datenmatrix; Datenverarbeitung und Interpretation der Ergebnisse; Gruppierung und Gewichtung der zu untersuchenden Variablen; selbstständiges und alleiniges Verfassen der ersten Version des Manuskriptes; Finalisierung des Manuskriptes unter Einbeziehung der Anregungen der Co-Autoren sowie der Reviewer des Journal of Addiction.

Publikation 2: Sofin Y, Danker-Hopfe H, Neu P. The Effect of Significant International Sports Events on Qualified Detoxification Treatment Outcome - Do Drop-Out Rates Change during UEFA European Championship? PLOS ONE, 2016

80%: Substantielle Mitwirkung bei der Erstellung des Studienkonzeptes, Datenverarbeitung und -interpretation, selbstständiges und alleiniges Verfassen der ersten Version des Manuskriptes inklusive der Abbildungen. Finalisierung des Manuskriptes unter Einbeziehung der Anregungen der Co-Autoren sowie der Reviewer von PLOS ONE.

Publikation 3: Neu P, Sofin Y, Danker-Hopfe H. The effect of detoxification on sleep: How does sleep quality change during qualified detoxification treatment? Journal of Addiction, 2018

70%: Mitwirkung bei der Erstellung des Studienkonzeptes, Datenverarbeitung und -interpretation, selbstständiges und alleiniges Verfassen der ersten Version des Manuskriptes. Finalisierung des Manuskriptes unter Einbeziehung der Anregungen der Co-Autoren sowie der Reviewer des Journal of Addiction.

Unterschrift der Doktorandin

7. AUSGEWÄHLTE PUBLIKATIONEN

7.1 ORIGINALARBEIT 1

Sofin Y, Danker-Hopfe H, Gooren T, Neu P. Predicting Inpatient Detoxification Outcome of Alcohol and Drug Dependent Patients: The Influence of Sociodemographic Environment, Motivation, Impulsivity, and Medical Comorbidities. *J Addict*; Volume 2017 (2017)

<https://doi.org/10.1155/2017/6415831>

Impact Factor: Nicht verfügbar für Journal of Addiction

Research Article

Predicting Inpatient Detoxification Outcome of Alcohol and Drug Dependent Patients: The Influence of Sociodemographic Environment, Motivation, Impulsivity, and Medical Comorbidities

Yvonne Sofin,¹ Heidi Danker-Hopfe,² Tina Gooren,³ and Peter Neu^{1,3}

¹Jewish Hospital Berlin, Clinic for Psychiatry and Psychotherapy, Heinz-Galinski-Str. 1, 13347 Berlin, Germany

²Competence Center for Sleep Medicine, Charité-School of Medicine, Campus Benjamin Franklin, Hindenburgdamm 30, 12203 Berlin, Germany

³Charité-School of Medicine, Campus Benjamin Franklin, Hindenburgdamm 30, 12203 Berlin, Germany

Correspondence should be addressed to Peter Neu; peter.neu@charite.de

Received 22 December 2016; Accepted 13 February 2017; Published 6 March 2017

Academic Editor: Markus Backmund

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Aims. This prospective study aims to identify patient characteristics as predictors for treatment outcome during inpatient detoxification treatment for drug and alcohol dependent patients. **Methods.** A mixed gender sample of 832 consecutively admitted drug and alcohol dependent patients were interviewed by an experienced physician. The impact of a variety of factors concerning social environment, therapy motivation, impulsivity related variables, medical history, and addiction severity on treatment outcome was examined. **Results.** 525 (63.1%) of the patients completed detoxification treatment whereas 307 (36.9%) dropped out prematurely. Being female, living in a partnership, having children, being employed, and having good education were predictive for a positive outcome. Family, health, the fear of losing the job, prosecution, and emergency admission were significant motivational predictors for treatment outcome. Being younger, history of imprisonment, and the number of previous drop-outs were predictive for a negative outcome. **Conclusions.** Variables concerning social environment and the number of previous drop-outs have been identified as best predictors for treatment outcome. Socially stable patients benefit from the current treatment setting and treatment shall be adapted for patients with negative predictors. Treatment may consequently be tailored with respect to intervention type, duration, and intensity to improve the outcome for those patients that fulfil criteria with negative impact on treatment retention.

1. Introduction

Addiction is a chronic disease that affects millions of individuals worldwide. In Germany, alcohol dependence is the most serious, expensive, and socially disruptive health issue [1]. In industrialized countries, alcoholism is among the leading causes of death [2]. Qualified detoxification treatment (QDT) is the first step in inpatient substance abuse treatment. Premature discontinuation of QDT is a serious and common complication in the detoxification treatment [3]. The risk of relapse substantially determines prognosis and mortality of the disease [4]. Treatment noncompletion is generally associated with poor success and an unfavourable long-term outcome [5]. Regular completion of treatment is therefore

a key success criterion of inpatient detoxification treatment as the discontinuation of therapy is usually accompanied by a relapse [6]. For both, alcohol dependent and drug dependent patients, high drop-out rates were reported in literature. Thus, a drop-out rate of 33% has been reported for alcohol dependents [7], while the observed drop-out rate for illicit drug users was even higher at 50% [8]. Therefore it is of high importance to identify determinants and risk factors of unplanned premature discharge and to adapt the treatment for the individual patient accordingly. Some predictors were repeatedly identified in previous studies: for drug addiction, level of education, unemployment, and delinquency were predictive for relapse [9–11]. For alcohol addiction, significant predictors were the number of prior hospitalizations for

detoxification, dependence severity, and psychopathologic rating [1, 12, 13]. The link between illicit drug use and crime is well documented [14]. Backmund et al. [10] found history of imprisonment and currently being on probation to be significant predictors of completing detoxification treatment. Previous studies indicated that lower injection frequency before admission was associated with twofold increases in the likelihood of having favourable follow-up outcomes on illicit drug use, alcohol use, and criminal involvement [15].

Additionally, impulsivity plays a major role in substance use disorders [16]. Impulsiveness involves behaviour characterized by little or no forethought or consideration of the consequences [17]. Impulsive actions are therefore often poorly conceived or inappropriate to the situation and result in undesirable consequences, for example, choosing short-term gains over long-term gains [18]. Suicide attempts are often regarded as impulsive acts [19]. According to Wines Jr. et al. [20], previous suicide attempts are common in substance-dependent individuals. Nearly half of the drug dependent patients (45%) reported having attempted suicide at some point of their life [21]. Pretreatment suicide attempts are associated with a higher likelihood of relapse [22].

The purpose of the present study was to identify further predictors of premature discharge during inpatient QDT for drug and alcohol dependent patients to thereby achieve better outcomes in terms of treatment completion for drug or alcohol dependent patients. With regard to the high costs in public healthcare systems, prediction of treatment outcome provides the opportunity to identify client groups that achieve poorer outcomes and identify targets in treatment to improve inpatient detoxification treatment. Clinicians should be enabled to set realistic treatment goals and adapt intervention duration and intensity. We therefore conducted a prospective analysis to investigate the influence of sociodemographic as well as medical variables on QDT outcome on patients suffering from addiction.

2. Methods

2.1. Participants. During the year 2012, 914 consecutively drug and alcohol dependent patients admitted to the hospital were screened and asked for participation. 832 patients were included in the study. All patients fulfilled the DSM-IV criteria for substance addiction and gave their written informed consent to participate in this study. Exclusion criterion was noncapacity of giving informed consent (severe organic or psychiatric disorders like Korsakow syndrome, etc.).

2.2. Setting and Treatment Procedure. The study was conducted on two specialized inpatient units for qualified detoxification treatment of addiction diseases in a psychiatric hospital in Berlin, Germany. The treating team comprised medical doctors, psychologists, specialized nurses, occupational therapists, physiotherapists, and social workers. The qualified detoxification treatment enriches detoxification treatment with psychoeducation and relapse prevention. It consists of three steps. While detoxification the patients were withdrawn from the drug and, where needed, withdrawal symptoms

were treated. In the second step, the patients had to attend at least ten group-therapy sessions and five psychoeducational group-sessions. In the third step, the preparation of transition to a long-term follow-up treatment after hospital discharge including the attendance of five self-help groups outside the clinic was conducted.

The average treatment took between 12 and 16 days but could last longer in case of persisting withdrawal symptoms or particularly severe general condition.

Clomethiazole at tapered doses was used for alcohol detoxification. Methadone at tapered doses was used for opioid detoxification. For cannabis, amphetamines and cocaine detoxification abrupt cessation without medical support was chosen. The severity of alcohol withdrawal symptoms was captured according to the CIWA Withdrawal Score [23].

2.3. Diagnostic Criteria. For diagnosis of addiction and concomitant diseases Diagnostic and Statistical Manual (DSM) edition IV was applied.

2.4. Definition of Outcome Criteria. The treatment was considered successfully completed if the patient remained abstinent while hospital stay and participated in the treatment program as described above until regular discharge. The attendance to at least ten group-therapy sessions, five psychoeducational group-sessions, and five self-help groups outside the clinic was mandatory.

The treatment was considered aborted if the patient left against medical advice or due to disciplinary early discharge. Substance use or refusal to participate in the treatment program led to disciplinary discharge.

2.5. Data Analysis. Data on the patient's social environment consisting of information on their living and domestic situation, children, graduation, employment, and native language were collected. Additionally, the patient's therapy motivation was asked upon hospital admission (Table 2). Answers are comprised of fear of losing the partner or family, harming his or her health, fear of losing the job and/or residence, making a therapy instead of imprisonment, the aim of abstinence, and other motivations. Some patients did not specify their motivation.

The patient's impulsiveness was measured by data on experience of violence, aggressive behaviour, suicidal tendency, and information on constraints in terms of judicial proceedings, probation, and imprisonment. Further, the impact of intravenous drug use and the effect of genetic predisposition on impulsiveness related behaviour expressed by addiction and suicidal tendency in relatives were elaborated.

All patients were admitted electively for qualified detoxification treatment except for emergency admissions.

Data on medical history comprised the addiction diagnoses and, if applicable, addiction associated disorders, for example, central nervous system damage.

All data were captured by an experienced physician during structured face to face admission interview. Statistical analyses were carried out using SAS (statistical analysis system) software by SAS Institute. It was separately examined

for all variables, whether there was a difference between the patients with and without premature treatment completion. For nominal and ordinal scaled variables, the examination was carried out with log likelihood Chi square test. For interval scaled data, the relationship between the respective variable and premature discharge was analyzed with a *t*-test for independent samples (if normal distribution was assumed) or with a Wilcoxon 2-sample test (if normal distribution could not be assumed). Normal distribution was tested using the Kolmogorov-Smirnov test with a two-sided significance level of $p < 0.01$. Tests on group differences were examined with a two-sided significance level of $p < 0.05$. *p* values of 0.05 or less were considered statistically significant. Furthermore logistic regression analyses were performed separately for the 4 clusters of variables: (1) sociodemographic determinants, (2) motivational and addiction associated determinants, (3) impulsiveness related characteristics of patients, and (4) determinants from the patient's medical history to identify significant predictors of the treatment outcome. In the logistic regression the probability of a premature treatment completion was modelled.

3. Results

3.1. Patient Characteristics. 832 patients were included in the study. 619 (74%) patients were male and 213 (26%) were female. The mean age was 44 (± 13) years. Sociodemographic details of the sample are given in Table 1. The patient sample was characterized by a high number of patients without partnership (60.3%) and 45.2% participants that were dependent on welfare. 32.7% were unskilled and more than one in ten patients was homeless. Asked about their therapy motivation, health and family were frequent answers with 27.8 and 20.0%, respectively (see Table 2). Of the 832 patients included, the most frequent diagnosis was alcohol addiction with 71.4% followed by 12.3% opioid abuse. While 64.7% suffered of only one addiction, 35.3% had more than one diagnosed addiction (Table 4(a)).

3.2. Determinants for Premature Treatment Drop-Out. Overall, 525 (63.1%) of the 832 patients completed detoxification treatment whereas 307 (36.9%) dropped out of the program. The 307 individuals of the drop-out group comprised 249 patients (81.1%) that prematurely terminated the treatment on their own initiative while 58 (18.9%) were discharged due to disciplinary reasons. Patients in the treatment drop-out group were significantly younger (39 years) than the patients who completed the treatment (46 years) and men dropped out more often than women (38.9% versus 31.0%).

In this study, all tested sociodemographic pretreatment variables showed a significant influence on the treatment outcome. Patients that were female, lived in a partnership, or were at least together with other individuals, had children and were employed, were well-educated, and spoke German as native language were more likely to finish the treatment successfully. Having children had a positive impact on the treatment outcome. At least 65.7% of the patients with children completed the treatment regularly, whereas only

57.2% of the childless patients completed the treatment. In our study, the increasing number of children did not correlate with an increasing probability of treatment completion. The higher the patient's graduation and occupational training was, the higher the probability to complete the treatment regularly was (Table 1(a)). Logistic regression revealed that being younger and being unemployed significantly increased the risk of a unplanned, premature discharge. But it did not confirm the influence of the gender on treatment outcome (Table 1(b)).

Family, health, the fear of losing the job, prosecution, and emergency admission were significant motivational predictors for QDT outcome. For the patients that did not specify a certain motivation or named abstinence as treatment motivation, no significant influence was shown. Individuals with no prior detoxification significantly more often completed the treatment regularly. Also, we found that patients with no previous treatment drop-outs significantly more often completed QDT ($p = 0.0001$). The duration of the longest period of the patients' abstinence ($p = 0.0874$) was not predictive for an early treatment drop-out (Table 2(a)).

Logistic regression with all motivation and treatment variables revealed that treatment motivation is not significant for treatment outcome but that the number of previous drop-outs was the best predictors for outcome. Subjects with one or two previous early discharges had a 4.7-fold increased risk (95%-CI: 2.9; 7.4) and for subjects with three or more previous premature discharges the risk increased even to 10.4 (95%-CI: 4.0; 27.6). The number of previous premature drop-outs was hence the best predictor of all 4 clusters examined in our study. Logistic regression further confirmed that duration of abstinence is not predictive for treatment retention, although the longest duration of abstinence was twice as long in patients that completed the treatment as in patients that dropped out (Table 2(b)).

Table 3(a) illustrates the impact of personality in terms of impulsiveness related variables on treatment outcome. Among the impulsiveness related variables, experiences of violence, aggressive behaviour towards third parties, history of imprisonment, and intravenous drug use influenced treatment outcomes negatively. For subjects with prior suicide attempts the number of drop-outs was not statistically significant. Similarly, genetic predisposition did not predict treatment outcome, neither concerning relatives of first or second degree with addiction nor for relatives of first or second degree with suicidal behaviour.

These findings were verified by logistic regression analysis. In particular, patients without a history of imprisonment (OR: 0.50; 95%-CI: 0.33; 0.76) and patients without intravenous drug use (OR: 0.45; 95%-CI: 0.30; 0.69) have a significantly reduced risk of premature treatment completion (Table 3(b)).

Data on the patient's medical history were analyzed (Table 4(a)). The presence of an addiction related infection ($p = 0.0145$) or a central nervous system disorder ($p = 0.0416$) was predictive for treatment outcome. On the other hand, comorbid gastrointestinal disorders ($p = 0.0554$) or peripheral central nervous system damage ($p = 0.7909$) was not predictive for treatment outcome. Considering the

TABLE 1

(a) Results of likelihood Chi square test for sociodemographic determinants of premature treatment drop-out.

Characteristics	Total N = 832	Treatment completed N = 525	Dropped out of treatment N = 307	<i>p</i>
Age (years)	43.8	46.3	39.4	0.0001
Sex				0.0365
Male	619 (74.4%)	378 (61.1%)	241 (38.9%)	
Female	213 (25.6%)	147 (69.0%)	66 (31.0%)	
Partnership				0.0020
Living in a partnership	330 (39.7%)	229 (69.4%)	101 (30.6%)	
No partnership	501 (60.3%)	295 (58.9%)	206 (41.1%)	
Living situation				0.0469
Living alone	456 (54.8%)	274 (60.1%)	182 (39.9%)	
Living with other(s)	376 (45.2%)	251 (66.8%)	125 (33.2%)	
Children				0.0026
No children	418 (50.2%)	239 (57.2%)	179 (42.8%)	
One child	173 (20.8%)	124 (71.7%)	49 (28.3%)	
Two children	166 (20.0%)	109 (65.7%)	57 (34.3%)	
Three or more children	75 (9.0%)	53 (70.7%)	22 (29.3%)	
Graduation				0.0001
High school (13 years of school)	158 (19.0%)	116 (73.4%)	42 (26.6%)	
Realschule (10 years of school)	235 (28.3%)	170 (72.3%)	65 (27.7%)	
Hauptschule (9 years of school)	363 (43.6%)	205 (56.5%)	158 (43.5%)	
No graduation	76 (9.1%)	34 (44.7%)	42 (55.3%)	
Occupational training				0.0001
Academic studies	86 (10.4%)	69 (80.2%)	17 (19.8%)	
Apprenticeship	473 (56.9%)	324 (68.5%)	149 (31.5%)	
Unskilled	272 (32.7%)	132 (48.5%)	140 (51.5%)	
Employment				0.0001
Employed	226 (27.3%)	174 (77.0%)	52 (23.0%)	
Pensioned	104 (12.6%)	82 (78.9%)	22 (21.1%)	
Welfare	375 (45.2%)	194 (51.7%)	181 (48.3%)	
Unemployed	124 (14.9%)	73 (58.9%)	51 (41.1%)	
Residence				0.0001
Living in own residence	599 (72.0%)	396 (66.1%)	203 (33.9%)	
Assisted living	81 (9.7%)	55 (67.9%)	26 (32.1%)	
Other	50 (6.0%)	17 (34.0%)	33 (66.0%)	
Homeless	102 (12.3%)	57 (55.9%)	45 (44.1%)	
Mother tongue				0.0041
German	646 (77.1%)	426 (65.9%)	220 (34.1%)	
Foreign mother tongue	181 (21.9%)	96 (53.0%)	85 (47.0%)	

(b) Results of logistic regression analysis with sociodemographic determinants of premature treatment drop-out.

Characteristic	OR	95% CI	Wald Chi2	<i>p</i>
Age	0.96	0.95–0.98	19.32	<0.0001
Sex				
Male	1.00			
Female	0.95	0.66–1.37	0.08	0.7789
Partnership				
Living in a partnership	1.00			
No partnership	1.02	0.64–1.63	0.01	0.9405
Living situation				
Living alone	1.00			
Living with other(s)	0.76	0.48–1.22	1.23	0.2572

(b) Continued.

Characteristic	OR	95% CI	Wald Chi2	<i>p</i>
Children				
No children	1.00			
One child	0.72	0.47–1.11	2.25	0.1336
Two children	1.17	0.75–1.81	2.21	0.1371
Three or more children	0.85	0.46–1.55	0.14	0.7090
Graduation				
High school (13 years of school)	1.00			
Realschule (10 years of school)	0.86	0.48–1.57	3.66	0.0556
Hauptschule (9 years of school)	1.47	0.83–2.59	2.92	0.0877
No graduation	1.47	0.70–3.12	1.06	0.3036
Occupational training				
Academic studies	1.00			
Apprenticeship	1.13	0.53–2.44	0.06	0.8065
Unskilled	1.44	0.63–3.27	1.31	0.2533
Employment				
Employed	1.00			
Pensioned	1.41	0.74–2.69	0.01	0.9503
Welfare	1.52	0.91–2.53	0.10	0.7461
Unemployed	1.97	1.30–2.98	6.00	0.0143
Residence				
Living in own residence	1.00			
Assisted living	0.70	0.41–1.20	3.70	0.0543
Other	1.67	0.80–3.47	2.54	0.1109
Homeless	1.10	0.69–1.76	0.03	0.8670
Mother tongue				
German	1.00			
Foreign mother tongue	1.35	0.93–1.97	2.46	0.1170

diagnosed addiction, the first as well as the second addictive disorders were significantly related to treatment outcome whereas the third diagnosed addiction was not ($p = 0.0865$). Of 538 patients diagnosed with only one addiction, 67.3% completed the treatment successfully. In our study, patients with first addiction diagnosis of alcohol addiction or pathological gambling completed the treatment in 70% and 100%, respectively, of the cases. In contrast, more than half of the individuals with cannabis, opioid, or multiple drug abuse dropped out the treatment.

Having an additional, nonaddiction related diagnosis had a significant beneficial effect on treatment outcome ($p = 0.0001$). Logistic regression confirms that having no disorder other than the addictive disorder doubled the risk of premature treatment completion significantly (OR 2.07, 95% OR: 1.50–2.86). Furthermore, it revealed that having alcohol dependency as the first diagnosed addictive disorder increased the risk of premature treatment drop-out significantly (see Table 4(b)). Opioid dependency increased the risk to 3.23 (95% OR: 1.98–5.25), while subjects dependent from cannabis, sedatives/hypnotics, cocaine, pathological gambling, or multiple drug use have twice the risk of alcohol addicted people (OR 2.12, 95% OR: 1.40–3.21) to drop out from treatment.

4. Discussion

The aim of the present study was to identify predictors of premature discharge during inpatient QDT for alcohol and drug dependent patients. This study showed that drug dependent patients bare an elevated risk of premature treatment drop-out compared to alcohol dependent patients. These findings are consistent with past research described in literature. Braune et al. described drop-out rates of 43.3% for alcohol dependent and 62.4% for drug dependent patients [9]. Our results further suggest that, for patients with multiple addictions, the main addiction, as well as the second, if applicable, has an influence on treatment outcome, but not if they suffer of more than two addictions. Further investigation should be carried out to verify if there is indeed no distinction in patients using more than two substances. In our study, 100% of the pathologic gamblers succeeded, but further investigations on the influence of pathologic gambling on the likelihood of relapse shall be conducted to verify this finding, as in the present study only four patients with pathologic gambling were included which limits the generalisability of the finding.

In our study, being female was a predictor for a better treatment outcome. But the result of logistic regression

TABLE 2

(a) Results of likelihood Chi square test for motivational and addiction associated determinants of premature treatment drop-out.

Characteristics	Total N = 832	Treatment completed N = 525	Dropped out of treatment N = 307	<i>p</i>
Motivation**				
Partner/family	166 (20.0%)	119 (71.7%)	47 (28.3%)	0.0093
Health	231 (27.8%)	164 (71.0%)	67 (29.0%)	0.0031
Job/residence	148 (17.8%)	104 (70.3%)	44 (29.7%)	0.0435
Prison (therapy instead of penalty)	15 (1.8%)	5 (33.3%)	10 (66.7%)	0.0184
Abstinence	164 (19.7%)	100 (61.0%)	64 (39.0%)	0.5302
Emergency	69 (8.0%)	35 (50.7%)	34 (49.3%)	0.0285
Other	221 (26.6%)	134 (60.6%)	87 (39.4%)	0.3766
Motivation not specified	41 (4.9%)	21 (51.2%)	20 (48.8%)	0.1115
Number of previous detoxification treatments				0.0002
None	295 (35.5%)	209 (70.9%)	86 (29.1%)	
1-2 detoxification treatments	269 (32.3%)	173 (64.3%)	96 (35.7%)	
3-10 detoxification treatments	210 (25.2%)	110 (52.4%)	100 (47.6%)	
11-20 detoxification treatments	39 (4.7%)	25 (64.1%)	14 (35.9%)	
More than 20 detoxification treatments	19 (2.3%)	8 (42.1%)	11 (57.9%)	
Duration of substance dependency (years)	15.2	15.6	14.4	0.1139
Longest period of abstinence (months)	12.7	15	8.8	0.0874
Number of previous drop-outs				0.0001
None	639 (76.8%)	457 (71.5%)	182 (28.5%)	
1-2 drop-outs	149 (17.9%)	54 (36.2%)	95 (63.8%)	
3 or more drop-outs	44 (5.3%)	14 (31.8%)	30 (68.2%)	

**Multiple selections were allowed.

(b) Results of logistic regression analysis with motivational and treatment history variables as determinants.

Characteristic	OR	95% CI	Wald Chi2	<i>p</i>
Motivation				
Partner/family (no versus yes)	1.41	0.90-2.20	2.20	0.1376
Health (no versus yes)	1.42	0.91-2.24	2.43	0.1191
Job/residence (no versus yes)	1.45	0.90-2.32	2.35	0.1255
Prison (therapy instead of penalty)	0.42	0.13-1.42	1.95	0.1628
Abstinence (no versus yes)	0.97	0.59-1.58	0.02	0.8964
Emergency (no versus yes)	0.81	0.42-1.58	0.38	0.5389
Other (no versus yes)	0.95	0.60-1.52	0.04	0.8352
Not specified (no versus yes)	0.89	0.39-2.00	0.08	0.7724
Number of previous detoxification treatments				
None	1.00			
1-2 detoxification treatments	1.15	0.77-1.71	3.39	0.0654
3-10 detoxification treatments	1.08	0.65-1.81	2.77	0.0959
11-20 detoxification treatments	0.36	0.14-0.93	5.12	0.0237
More than 20 detoxification treatments	0.59	0.16-2.20	0.29	0.5926
Duration of substance dependency (years)	0.97	0.96-0.99	7.05	0.0079
Longest period of abstinence (months)	0.99	0.99-1.00	3.65	0.0560
Number of previous drop-outs				
None	1.00			
1-2 drop-outs	4.67	2.93-7.45	1.64	0.2001
3 or more drop-outs	10.45	3.97-27.56	11.14	0.0008

TABLE 3

(a) Results of likelihood Chi square test for impulsiveness related variables associated determinants of premature treatment drop-out.

Characteristics	Total N = 832	Treatment completed N = 525	Dropped out of treatment N = 307	<i>p</i>
Patient experienced abuse or violence				0.0475
Yes	192 (25.7%)	110 (57.3%)	82 (42.7%)	
No	554 (74.3%)	362 (65.3%)	192 (34.7%)	
Documented cases of aggressive behavior towards others				0.0082
Yes	141 (16.9%)	75 (53.2%)	66 (46.8%)	
No	691 (83.1%)	450 (65.1%)	241 (34.9%)	
Suicide attempts				0.5113
None	704 (84.9%)	448 (63.6%)	256 (36.4%)	
1 attempt	78 (9.4%)	47 (60.3%)	31 (39.7%)	
2 attempts	28 (3.4%)	18 (64.3%)	10 (35.7%)	
3 or more attempts	19 (2.3%)	9 (47.4%)	10 (52.6%)	
Patients in judicial proceeding				0.8027
Yes	15 (1.8%)	9 (60.0%)	6 (40.0%)	
No	817 (98.2%)	516 (63.2%)	301 (36.8%)	
Patients on probation				0.0813
Yes	33 (4.0%)	16 (48.5%)	17 (51.5%)	
No	799 (96.0%)	509 (63.7%)	290 (36.3%)	
Patients with history of imprisonment				0.0001
Yes	700 (84.1%)	58 (43.9%)	74 (56.1%)	
No	132 (15.9%)	467 (66.7%)	233 (33.3%)	
Intravenous drug use				0.0001
Yes	117 (14.1%)	49 (41.9%)	68 (58.1%)	
No	715 (85.9%)	476 (66.6%)	239 (33.4%)	
Number of relatives of first degree with addiction disorder				0.9800
None	490 (59.0%)	311 (63.5%)	179 (36.5%)	
1	260 (31.3%)	164 (63.1%)	96 (36.9%)	
2	64 (7.7%)	38 (59.4%)	26 (40.6%)	
3	14 (1.7%)	9 (64.3%)	5 (35.7%)	
4	3 (0.3%)	2 (66.7%)	1 (33.3%)	
Addiction in relatives of second degree				0.2120
Yes	207 (24.9%)	138 (66.7%)	69 (33.3%)	
No	624 (75.1%)	386 (61.9%)	238 (38.1%)	
Number of relatives of first degree with suicide				0.1211
None	809 (97.5%)	510 (63.0%)	299 (37.0%)	
1	19 (2.3%)	13 (68.4%)	6 (31.6%)	
2	2 (0.2%)	0 (0%)	2 (100%)	
Suicide attempts in relatives of second degree				0.7789
Yes	29 (3.5%)	19 (65.5%)	10 (34.5%)	
No	802 (96.5%)	505 (63.0%)	297 (37.0%)	

(b) Results of logistic regression analysis with impulsiveness related patient characteristics.

Characteristic	OR	95% CI	Wald Chi2	<i>p</i>
Patient experienced abuse or violence				
Yes	1.00			
No	0.82	0.61–1.12	1.57	0.2100

(b) Continued.

Characteristic	OR	95% CI	Wald Chi2	<i>p</i>
Documented cases of aggressive behaviour towards others				
Yes	1.00			
No	0.83	0.55–1.26	0.76	0.3819
Suicide attempts				
None	1.00			
1 attempt	1.03	0.62–1.70	0.01	0.9333
2 attempts	0.83	0.36–1.90	0.49	0.4832
3 or more attempts	1.43	0.54–3.81	0.63	0.4281
Patients in judicial proceeding				
Yes	1.00			
No	0.98	0.33–2.88	0.01	0.9654
Patients on probation				
Yes	1.00			
No	0.91	0.43–1.91	0.07	0.7973
Patients with history of imprisonment				
Yes	1.00			
No	0.50	0.33–0.76	10.23	0.0014
Intravenous drug use				
Yes	1.00			
No	0.45	0.30–0.69	13.37	0.0003
Number of first-degree relatives with addiction disorder				
Yes	1.00			
No	1.00	0.74–1.36	0.01	0.9929
Addiction in relatives of second degree				
Yes	1.00			
No	1.19	0.84–1.69	0.98	0.3232
Number of first-degree relatives with suicide				
Yes	1.00			
No	1.13	0.43–2.98	0.06	0.8018
Suicide attempts in relatives of second degree				
Yes	1.00			
No	1.12	0.50–2.53	0.08	0.7809

analysis suggests that not the gender itself but associated attributes of the female group influenced treatment outcome. This result differs from data in other studies where the drop-out rates were equal for men and women [23] or females relapsed significantly more often [24]. In our study, however, women were higher educated and were more frequently employed compared to men. Our findings indicate that a social network is supportive for a successful detoxification treatment and are consistent with other studies [1, 25]. Patients with higher education and employment live in better economic conditions and it is likely that they have a greater social network as well as an established daily structure. It is reasonable that children increase the probability of successful QDT as the responsibility for their wellbeing is likely to have a high influence on therapy motivation. This is consistent with our finding that family was a significant motivational predictor for treatment outcome. Asked about their motivation,

patients who feared prison dropped out noticeably more often than patients that mentioned other treatment motivations. This result may be influenced by the fact that delinquent patients live in unstable and unsupportive social networks. Furthermore, the motivation for their treatment was not intrinsic but forced involuntarily, as therapy was stipulated by court order to avoid imprisonment. As logistic regression did not show any significant impact of motivational variables, it seems likely that the kind of motivation is less important than having a therapy motivation at all and that again other attributes represented in those patients influenced treatment outcome.

As expected, a negative association was found for violence and aggression on the treatment outcome of our patients. Available figures indicate that 20% to 40% of all adults were exposed to domestic violence during childhood or adolescence [25]. Children from families with different parental

TABLE 4

(a) Results of likelihood Chi square test for medical determinants of premature treatment drop-out.

Characteristics	Total N = 832	Treatment completed N = 525	Dropped out of treatment N = 307	<i>p</i>
Addiction related comorbidity				
Infection	69 (8.3%)	34 (49.3%)	35 (50.7%)	0.0145
Gastrointestinal disorder	289 (34.7%)	195 (67.5%)	94 (32.5%)	0.0554
CNS disorder	60 (7.2%)	45 (75.0%)	15 (25.0%)	0.0416
Peripheral nervous system disorder	28 (3.3%)	17 (60.7%)	11 (39.3%)	0.7909
First diagnosed addictive disorder				
Alcohol	594 (71.4%)	417 (70.2%)	177 (29.8%)	0.0001
Opioid	102 (12.3%)	40 (39.2%)	62 (60.8%)	
Cannabis	50 (6.0%)	22 (44.0%)	28 (56.0%)	
Sedatives/hypnotics	33 (4.0%)	23 (69.7%)	10 (30.3%)	
Cocaine	13 (1.6%)	9 (69.2%)	4 (30.8%)	
Multiple drug use	36 (4.3%)	10 (27.8%)	26 (72.2%)	
Pathological gambling	4 (0.5%)	4 (100%)	0 (0%)	
Second diagnosed addictive disorder				
Patients with no second addiction diagnosis	538 (64.7%)	362 (67.3%)	176 (32.7%)	0.0045
Alcohol	26 (3.1%)	20 (76.9%)	6 (23.1%)	
Opioid	33 (3.9%)	14 (42.4%)	19 (57.6%)	
Opioid substitution	5 (0.6%)	2 (40%)	3 (60%)	
Cannabis	80 (9.6%)	49 (61.3%)	31 (38.7%)	
Sedatives/hypnotics	40 (4.8%)	24 (60.0%)	16 (40.0%)	
Cocaine	30 (3.6%)	14 (46.7%)	16 (53.3%)	
Stimulants	9 (1.0%)	5 (55.6%)	4 (44.4%)	
Multiple drug use	67 (8.0%)	32 (47.8%)	35 (52.2%)	
Pathological gambling	4 (0.4%)	3 (75.0%)	1 (25.0%)	
Third diagnosed addictive disorder				
Patients with no third addiction diagnosis	709 (85.2%)	459 (64.7%)	250 (35.3%)	0.0865
Alcohol	8 (0.9%)	3 (37.5%)	5 (62.5%)	
Opioid	10 (1.2%)	5 (50.0%)	5 (50.0%)	
Opioid substitution	4 (0.5%)	3 (75.0%)	1 (25.0%)	
Cannabis	9 (1.0%)	3 (33.3%)	6 (66.7%)	
Sedatives/hypnotics	0 (0%)	0 (0%)	0 (0%)	
Cocaine	13 (1.5%)	10 (76.9%)	3 (23.1%)	
Multiple drug use	75 (9.0%)	39 (52.0%)	36 (48.0%)	
Pathological gambling	4 (0.5%)	3 (75.0%)	1 (25.0%)	
Other diagnosed disorders				
Yes	338 (40.7%)	246 (72.8%)	92 (27.2%)	0.0001
No	493 (59.3%)	278 (56.4%)	215 (43.6%)	

(b) Results of logistic regression analysis from medical history.

Characteristic	OR	95% CI	Wald Chi2	<i>p</i>
Addiction related comorbidity: infection				
Yes	1.00			
No	0.67	0.38–1.19	1.86	0.1732
Addiction related comorbidity: gastrointestinal disorder				
Yes	1.00			
No	0.88	0.63–1.25	0.48	0.4889
Addiction related comorbidity: CNS disorder				
Yes	1.00			
No	1.29	0.68–2.47	0.60	0.4379

(b) Continued.

Characteristic	OR	95% CI	Wald Chi2	<i>p</i>
Addiction related comorbidity: peripheral nervous system disorder				
Yes	1.00			
No	0.52	0.23–1.18	2.48	0.1153
First diagnosed addictive disorder				
Alcohol	1.00			
Opioid	3.23	1.98–5.24	11.14	0.0008
Other	2.12	1.40–3.21	0.63	0.4282
Second diagnosed addictive disorder				
Yes	1.00			
No	1.15	0.79–1.69	0.53	0.4668
Third diagnosed addictive disorder				
Yes	1.00			
No	1.02	0.62–1.67	0.01	0.9542
Other diagnosed disorders				
Yes	1.00			
No	2.07	1.50–2.86	19.58	<0.0001

problems such as domestic violence and mental illness are a well-known at-risk group for various mental health and social problems [26].

As found by many authors, imprisonment and intravenous drug use were highly significant predictors for treatment retention. These patient attributes indicate a certain severity of addiction that impedes the detoxification treatment. These findings suggest that staying in treatment for a longer time and segregating patients from their environmental influences could increase their level of persistence.

Patients with no previous detoxification treatment and no previous drop-outs significantly more often completed QDT. These findings were in line with the results of Wagner et al. [27] who found a strong negative impact on abstinence probability depending on the number of inpatient detoxification treatments. It can be assumed that premature drop-outs and repeated detoxification treatments weaken the patient's self-efficacy and thereby increase the inhibition threshold to seek help. Interestingly, we found a decreased drop-out risk for patients that had more than 10 detoxification treatments. These patients may be more distressed by their repeated relapses and consequently engage themselves more actively in treatment. A further possible explanation is that patients with repeated detoxification treatments gain and increase profound knowledge of their disease and its treatment during QDT.

"Duration of substance dependency" was a further treatment variable that has been evaluated in the present study and that was also found to be a predictor for treatment outcome. This observation is in agreement with previous studies [1, 28] and suggests the influence of dependency severity on QDT outcome.

Comorbid infections or central nervous system disorders were predictive for treatment outcome. The impact of increased medical severity was supported by other studies [9, 29] and is consistent with our findings. We conclude that the decreased medical condition and the curative treatment that

the patients receive, respectively, may serve as an additional motivational factor for treatment retention. Additionally, these patients received an increased attention, not only from psychiatric but also from somatic doctors.

All assessments evaluated in this study, despite medical condition, were based on patient self-report. The present study does not allow corroboration of the patient's statements.

Although smoking highly contributes to the high costs in public healthcare systems, smokers wishing to quit smoking were not included in our study as smoking cessation requires different intervention types. In spite of these limitations, we were able to identify numerous variables with potential influence on successful inpatient qualified detoxification treatment.

In summary, younger age, male sex, living alone, being childless, a low level of education, no employment, history of imprisonment, intravenous drug use, being drug dependent, and in particular a high number of previous drop-outs were predictive for a premature treatment drop-out. Better social network in terms of family, employment and education, and a lower dependency severity positively predicted treatment outcome. These findings suggest that socially stable patients benefit from the current treatment setting and that treatment shall be adapted for the patients with negative predictors. Treatment may consequently be tailored with respect to intervention type, duration, and intensity to improve the outcome for those patients that fulfil criteria with negative impact on treatment retention.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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7.2 ORIGINALARBEIT 2

Sofin Y, Danker-Hopfe H, Neu P. The Effect of Significant International Sports Events on Qualified Detoxification Treatment Outcome - Do Drop-Out Rates Change during UEFA European Championship? PLOS ONE 11(12) (2016)

<https://doi:10.1371/journal.pone.0167446>

Impact Factor: 2.766

RESEARCH ARTICLE

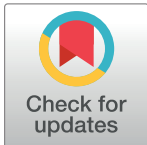
The Effect of Significant International Sports Events on Qualified Detoxification Treatment Outcome - Do Drop-Out Rates Change during UEFA European Championship?

Yvonne Sofin¹, Heidi Danker-Hopfe², Peter Neu^{1,3}*

1 Jewish Hospital Berlin - Clinic for Psychiatry and Psychotherapy, Berlin, Germany, **2** Competence Center for Sleep Medicine, Charité - School of Medicine, Campus Benjamin Franklin, Berlin, Germany, **3** Charité - School of Medicine, Campus Benjamin Franklin, Berlin, Germany

☞ These authors contributed equally to this work.

* peter.neu@jkb-online.de



Abstract

No previous studies have evaluated the influence of significant international sports events on qualified detoxification treatment outcome. This prospective study examines the impact of the 2012 UEFA European Football Championship on inpatient treatment outcome of alcohol dependent patients. Hospital admission and premature drop-out rates of consecutively admitted alcohol dependent patients were determined before, during and immediately after the UEFA Championship in the year 2012. The admission rate of male patients increased significantly after the European Football Championship had ended whereas for female patients, no change in admission rate was found. Daily average discharge rate was calculated. No statistically relevant differences between the treatment days before, during and after the UEFA Championship was found for the discharges. During the tournament, exclusively male patients dropped out. Our results are consistent with an interpretation of an association between European Football Championship and detoxification treatment outcome. Further research to replicate and extend our findings is necessary.

OPEN ACCESS

Citation: Sofin Y, Danker-Hopfe H, Neu P (2016) The Effect of Significant International Sports Events on Qualified Detoxification Treatment Outcome - Do Drop-Out Rates Change during UEFA European Championship? PLoS ONE 11(12): e0167446. doi:10.1371/journal.pone.0167446

Editor: Daniele Santini, Universita Campus Bio-Medico di Roma, ITALY

Received: August 8, 2016

Accepted: November 14, 2016

Published: December 28, 2016

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Data Availability Statement: All relevant data contained within the paper are available via contacting the authors at peter.neu@jkb-online.de.

Funding: The authors received no funding for this work.

Competing Interests: The authors have declared that no competing interests exist.

Introduction

Soccer is one of the most popular spectator sports worldwide. The UEFA European Football Championship is an international football tournament contested every four years and is considered the second most prestigious tournament after the FIFA World Cup. From 8th of June to 1st of July 2012, the 14th European Football Championships was hosted by Poland and Ukraine.

Alcohol is strongly associated with popular sport events [1]. That is why sport is saturated by the promotion of alcohol. The linkage of alcohol marketing and professional televised sports is widely present and known to effect alcohol consumption [2]. In the light of the above,

it is not surprising that the Danish brewery Carlsberg was one of the main sponsors of the 2012 European Football Championships.

No previous studies have evaluated the influence of significant international sports events on qualified detoxification treatment (QDT) outcome. The aim of the present study was to investigate whether drop-out rates of consecutively admitted alcohol dependent patients in a psychiatric hospital in Germany changed during UEFA European Championship. We analyzed the hospital admission and prematurely discharge rates before, during and immediately after the 2012 UEFA Championship to explore whether admission and discharge rates changed prior, during and after the European Football Championships and to identify whether the occurrence of popular spectator sports may serve as predictor for treatment outcome during inpatient detoxification treatment.

Methods

Participants

In 2012, 125 consecutively admitted alcohol dependent patients were included in the study. All patients fulfilled the DSM-IV criteria for alcohol addiction. Exclusion criterion was non-capacity of giving informed consent (e.g. due to severe organic or psychiatric disorders like Korsakow syndrome). For diagnosis of addiction and concomitant diseases Diagnostic and Statistical Manual (DSM) edition IV was applied.

Setting and treatment procedure

This prospective study was conducted on two specialized inpatient units for qualified detoxification treatment of addiction diseases in a psychiatric hospital in Berlin, Germany. Our research as well as the used informed consent form were approved by the Ethics Commission of the Charité – Universitätsmedizin Berlin. All participants provided their written consent to participate in this study.

The treating team comprised medical doctors, psychologists, specialized nurses, occupational therapists, physiotherapists and social workers. The qualified detoxification treatment consisted of three steps. While detoxification the patients were withdrawn from alcohol and, where needed, withdrawal symptoms were treated. In the second step, the patients had to attend to at least ten group-therapy sessions and five psycho-educational group-sessions. In the third step, the preparation of transition to a long-term follow-up treatment after hospital discharge including the attendance of five self-help groups outside the clinic was conducted. The average treatment took between 12 and 16 days, but could last longer in case of persisting withdrawal symptoms or particularly severe general condition. Clomethiazole at tapered doses was used for alcohol detoxification. The severity of alcohol withdrawal symptoms was captured according to the CIWA Withdrawal Score [3]. All patients were admitted electively for qualified detoxification treatment except for emergency admissions.

Definition of outcome criteria

The treatment was considered successfully completed if the patient remained abstinent while hospital stay and participated in the treatment program as described above until regular discharge. The attendance to at least ten group-therapy sessions, five psycho-educational group-sessions and additional five self-help groups outside the clinic was mandatory.

The treatment was considered aborted if the patient left against medical advice or due to disciplinary early discharge. Substance use or refusal to participate in the treatment program led to disciplinary discharge.



Fig 1. Examined periods ahead during and after UEFA European Championship 2012.

doi:10.1371/journal.pone.0167446.g001

Data analysis

Four periods were defined to differentiate patients at risk to prematurely terminate treatment due to the UEFA European Championship from those patients who dropped out independently from the Championship. All patients received an elaborate description on the average treatment duration in preparation for the qualified detoxification treatment. As the average detoxification treatment took 14 days, we defined periods of 13 days. Period I covered the days 26 to 13 ahead to the UEFA European Championship 2012. Period II covered day 13 to day 0 ahead the Championship. Period III covered the tournament (24 days) while period IV covered the 13 days after termination of the Championship. The patients admitted in periods 2 and 3 were therefore considered at risk to miss tournament days. Patients admitted in periods 1 and 4 were considered as non-jeopardized patients as they were able to finish treatment regularly prior to UEFA European Championship start, respectively after the tournament (Fig 1).

For further elaboration, two patient groups were considered: The first group comprised of all patients that were admitted for qualified detoxification treatment during the four periods. The second group consisted of all patients that were discharged during the defined periods.

Medical anamnesis was captured by an experienced physician during structured face to face admission interview. Statistical analyses were carried out using SAS (statistical analysis system) software by SAS Institute. The examination was carried out with log likelihood qui square test. Tests on group differences were examined with a two-sided significance level of $p < 0.05$. Age differences were examined with Wilcoxon 2 sample test. P values of 0.05 or less were considered statistically significant.

Results

Patient characteristics

The group of admitted patients comprised of 125 patients that could be included in the study. 93 (74.4%) patients were male, 32 (25.6%) were female. The mean age was 45.5 (± 11.9) years. The patient characteristics are shown in Table 1.

Overall, 93 (74.4%) of the patients admitted during the four periods, completed detoxification treatment. The individuals that dropped out comprised of 25 (26.9%) male patients that terminated the treatment irregularly while only 7 (21.9%) of the female patients dropped out. We found no statistically significant differences ($p = 0.4546$) between the male patient's mean

Table 1. Patient characteristics of all admitted patients.

Characteristic	Mean age [years] \pm SD	p value
Total (N = 125)	45.5 \pm 11.9	
Male sex (N = 93)	44.2 \pm 11.9	0.4546
Female sex (N = 32)	45.9 \pm 11.9	
Treatment completed (N = 93)	45.4 \pm 12.2	0.6760
Dropped out of treatment (N = 32)	45.8 \pm 11.2	

doi:10.1371/journal.pone.0167446.t001

Table 2. Patient characteristics (discharges).

Characteristic	Mean age [years] ± SD	p value
Total (N = 116)	46.5 ± 11.9	0.6387
Treatment completed (N = 81)	47.1 ± 12.4	
Dropped out of treatment (N = 35)	45.2 ± 10.9	

doi:10.1371/journal.pone.0167446.t002

age (44.2 ± 11.9) and the female patient’s mean age (45.9 ± 11.9). Neither we found significant differences in the mean age of patients that completed the treatment regularly and the patients that dropped-out of treatment (p = 0.6760). In our study, we further found no significant differences in the distribution of treatment completers and drop-outs between the sexes (p = 0.5712).

Table 2 shows the patient characteristics of the second group which consisted of all patients that were discharged during the four periods.

81 (69.8%) of the patients discharged during the four periods, completed detoxification treatment regularly, while 35 (30.2%) dropped out. The individuals that dropped out comprised of 28 (35.9%) male patients that terminated the treatment irregularly while 7 (18.4%) of the female patients dropped out. As before for the admissions, we found no significant difference in the mean age of patients that completed the treatment regularly and the patients that dropped-out of treatment (p = 0.6387).

European Football Championship 2012

Admission as well as prematurely treatment drop-outs were captured for the weeks before, during and after the tournament. In all four periods, the admissions showed a fluctuant course.

Period I to III showed similar admission patterns for both genders, while in period IV, right after the tournament, the admission rate of male patients increased significantly (p = 0.0295). The admission rate of female patients in turn decreased after the European Football Championship (Fig 2).

Average daily admission rate was calculated. In periods 2 and 3 (immediately prior and during the European Championship), the admission rate decreased compared to period 1 and 4 (Table 3).

We standardized the average admission rate for of each period and compared the distribution of admissions between the sexes. For female patients, the average admission rate did not differ between the periods (p = 0.2745). But we found a significant difference in the distribution of admissions for male patients (p = 0.0295).

Also the premature treatment drop-outs were analyzed for the four periods. As the admissions, the patient drop-outs showed a fluctuant course (Fig 3).

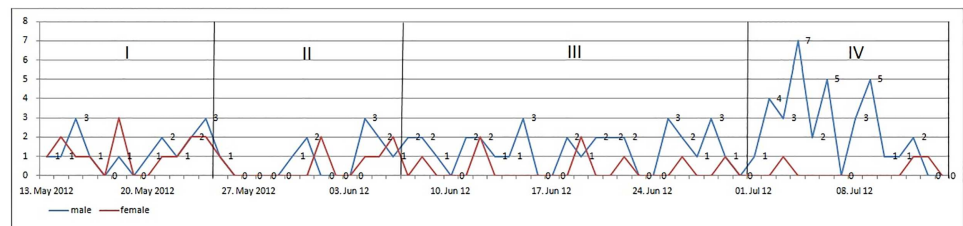


Fig 2. Daily admissions ahead, during and after European Football Championship 2012.

doi:10.1371/journal.pone.0167446.g002

Table 3. Daily admissions per period.

Period	Period duration [days]	Total admissions per day
1	13	1.8
2	13	1.0
3	24	1.2
4	13	2.0

doi:10.1371/journal.pone.0167446.t003

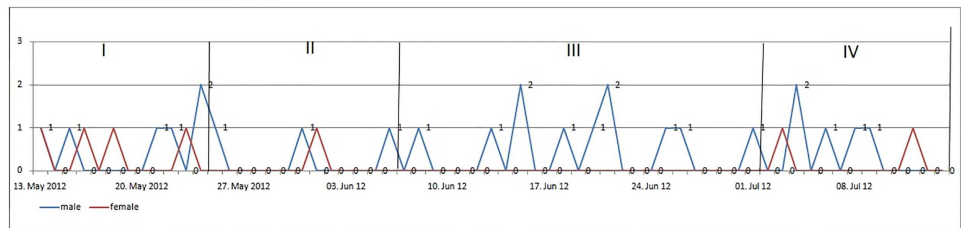


Fig 3. Premature drop-outs ahead, during and after European Football Championship 2012.

doi:10.1371/journal.pone.0167446.g003

In our study, no female patient terminated the treatment prematurely during the European Championship. For male patients, on the other hand, no change in discharge pattern could be observed. As for the admissions, daily average drop-out rate was calculated (Table 4).

In the first period, we found an increased average drop-out rate compared to periods 2 to 4 (Table 4). We standardized the average drop-out rate for of each period and compared the distribution of treatment drop-outs between the sexes. For male patients, the drop-out rates did not differ between the periods ($p = 0.7821$). For female patients, a statistically significant increase in drop-outs was found for period 1 ($p = 0.0122$).

Discussion

The aim of this prospective study was to evaluate whether the European Football Championships 2012 impacted qualified detoxification treatment outcome. 125 patients from the admissions group, respectively 116 from the discharges group could be included in the study. 25.6% of the first group dropped out of detoxification treatment, whereas 30.2% of the discharges group completed the treatment irregularly. This comparatively low rate of unplanned discharges converge with data in other studies where drop-out rates between 30% and 44% for alcohol dependent patients were described [4–5]. We found an noticeable fluctuant course of admissions and drop-outs which can be explained by the fact that no patients were admitted during Pentecost (26 to 28 May 2012) and on the weekends.

We further found a significant increase in admissions of male patients after the European Football Championships had ended. These findings suggest that patients postponed detoxification treatment to not miss the tournament. It is further conceivable that previously abstinent

Table 4. Daily drop-outs per period.

Period	Period duration [days]	Total discharges per day
1	13	0.8
2	13	0.5
3	24	0.5
4	13	0.5

doi:10.1371/journal.pone.0167446.t004

patients relapsed in consequence of the strong association of soccer and alcohol. In first place, worldwide research demonstrated the increasingly pervasive nature of professional sports-related alcohol marketing [2]. Secondly, alcoholic beverages are commonly associated with sports [6], as for many spectators beer is a fixed component of a soccer event.

For female patients, no relation between the average admission rate and the tournament could be established.

However, no female patient terminated the treatment prematurely during the European Championship.

Our results indicate that sports events like the European Football Championships 2012 might be of less interest for female patients and therefore no motivation to prematurely terminate the treatment.

The increased drop-out rate in the first period was more likely linked to the public holidays due to Pentecost at the end of period one than to the UEFA European Football Championship. Further investigations on the influence of sports events on the likelihood of relapse shall be conducted to verify this finding, as in the present study only 32 female patients were included which limits the generalisability of the finding.

In conclusion, it is conceivable that European Football Championship 2012 impacted qualified detoxification treatment of male alcohol-dependent patients, but the present study does not allow corroboration of our finding without additional examinations of upcoming sports events. Still, one has to emphasize that statistical association does not establish causality, therefore further research could provide more accurate information if significant international sports events may serve as predictor for QDT outcome.

Acknowledgments

All authors contributed equally to this work and fulfilled authorship criteria. Despite this, no other persons contributed to this work.

Author Contributions

Conceptualization: PN.

Data curation: YS.

Formal analysis: HD.

Investigation: PN YS.

Methodology: PN YS HD.

Project administration: PN.

Supervision: PN.

Validation: YS.

Visualization: YS HD.

Writing – original draft: YS.

Writing – review & editing: PN YS HD.

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7.3 ORIGINALARBEIT 3

Neu P, Sofin Y, Danker-Hopfe H. The effect of detoxification on sleep: How does sleep quality change during qualified detoxification treatment? J Addict; Volume 2018 (2018)

<https://doi.org/10.1155/2018/9492453>

Impact Factor: Nicht verfügbar für Journal of Addiction

Research Article

The Effect of Detoxification on Sleep: How Does Sleep Quality Change during Qualified Detoxification Treatment?

Peter Neu ^{1,2}, Yvonne Sofin ¹, and Heidi Danker-Hopfe³

¹Jewish Hospital Berlin, Clinic for Psychiatry and Psychotherapy, Heinz-Galinski-Str. 1, 13347 Berlin, Germany

²Charité, Universitätsmedizin Berlin, Corporate member of Freie Universität Berlin, Humboldt-Universität zu Berlin, and Berlin Institute of Health, Department of Psychiatry, Hindenburgdamm 30, 12203 Berlin, Germany

³Charité, Universitätsmedizin Berlin, Corporate member of Freie Universität Berlin, Humboldt-Universität zu Berlin, and Berlin Institute of Health, Competence Center for Sleep Medicine, Campus Benjamin Franklin, Hindenburgdamm 30, 12203 Berlin, Germany

Correspondence should be addressed to Peter Neu; peter.neu@jkb-online.de

Received 21 October 2018; Accepted 3 December 2018; Published 20 December 2018

Academic Editor: Leandro F. Vendruscolo

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Aims. Sleep disturbances are common in addiction and withdrawal. This study examined the course of sleep quality in a population of alcohol dependent patients during qualified detoxification treatment in a psychiatric hospital. **Methods.** The Pittsburgh Sleep Quality Index (PSQI) was administered to 77 electively admitted alcohol dependent patients hospitalized for qualified detoxification treatment. Sleep quality was measured at admission and at discharge. **Results.** The prevalence of bad sleep as measured by a PSQI-score > 5 was 70.1% at admission. During detoxification, male and female patients were equally affected by sleep disturbances and improvement of sleep was not significantly different between males and females. The PSQI score at admission predicted the change of the PSQI score during qualified detoxification treatment. After inpatient detoxification, sleep disturbances persisted in 59.7% of the patients. **Conclusions.** Contrary to our expectations, the average patient's sleep quality improved in our study after two weeks of detoxification treatment. Sleep disturbances nevertheless persisted in almost two-thirds of the patients. In the view of that finding, patients may require individual evaluation of sleep quality and insomnia-specific treatment in the course of detoxification therapy.

1. Introduction

The aetiology of sleep disturbances in addiction seems bidirectional. Research has shown that sleep disturbances experienced early in life predispose an individual to develop a substance use disorder [1] while in turn substance abuse contributes to sleep problems [2]. Repeated administration of substances of abuse can alter the homeostatic balance of neurotransmitters such as acetylcholine [3], dopamine, glutamate [4, 5], GABA [6], norepinephrine [7], and hypocretin/orexin [8] which leads to tolerance and contributes to the development of dependence. Many of the same neurotransmitter systems that are affected by substances of dependence are involved in the regulation of circadian rhythms and sleep physiology [9]. As a result, sleep disturbances are common among people with substance use disorders [10]. Insomnia is highly prevalent in patients with addiction during active

use of the substance [11]. Substance use can exacerbate sleep difficulties, which in turn present a risk factor for substance use or relapse [12]. Sleep problems can hereby occur during withdrawal, but have also been found to persist long after withdrawing from the drugs [13]. Nearly 70 % of the patients were admitted for detoxification report sleep problems prior to admission [14]. Alcohol is widely used as a sleep-promoting agent in self-medication of insomnia complaints [15]. Thus it is not surprising that sleep problems are extremely common in early alcohol recovery [16]. Individuals with alcohol dependence frequently report poor quality of sleep [17, 18]. Intoxication with alcohol produces prolonged latency to sleep, decreased total sleep time, and decreased percentage of REM (rapid eye movement) sleep [2]. Prolonged abstinence from alcohol leads to sleep fragmentation, a higher level of arousal during sleep, and an increase in the amount of REM sleep [19, 20].

The aim of the present study was to determine the frequency of bad sleep and the development of sleep quality in a population of alcohol dependent patients hospitalized for qualified detoxification treatment. We hypothesized that 1. sleep quality deteriorates after alcohol detoxification and that 2. bad sleep quality might serve as a predictor for relapse and subsequent unplanned treatment drop-out.

2. Methods

2.1. Setting and Treatment Procedure. This study was approved by the Ethics Commission of the Charité, Universitätsmedizin Berlin (application number EA1/250/12), and was conducted on two specialized inpatient units for qualified detoxification treatment of addiction diseases in a psychiatric hospital in Berlin, Germany. Actively used, treatment-seeking alcohol-dependent patients were recruited for participation. All fulfilled the DSM-IV criteria for substance addiction and gave their written informed consent to participate in this study. Exclusion criteria were dependent of substances other than alcohol and noncapacity of giving informed consent. The patients were admitted electively for qualified detoxification treatment except for emergency admissions. We applied the qualified detoxification treatment following the methods of Sofin et al. 2017 [21]. During detoxification from alcohol, withdrawal symptoms had to be treated with tapered doses of clomethiazole in the first 2 to 3 days of hospitalisation in 38 patients. Instead of benzodiazepines, clomethiazole with a short elimination half-life of 3 hours was administered to treat symptoms of acute alcohol withdrawal as benzodiazepines are characterised by an elimination half-life of several hours to days; thus the administration would have distorted our results.

2.2. Measures of Sleep Quality. Sleep quality was assessed by the Pittsburgh Sleep Quality Index (PSQI), a self-administered instrument to assess sleep duration, disturbance, latency, efficiency, quality, daytime sleepiness, and medication use [22]. The questionnaire consists of 18 items which are assigned to 7 components, each of which can assume a value range of 0 to 3. The total score results from the summation of these component scores can vary from 0 to 21, whereby a higher degree corresponds to a reduced sleep quality. In the year 2012 it was administered twice to 77 alcohol dependent patients. The first PSQI was filled out earliest on the fourth day of hospitalisation after the physical withdrawal from alcohol was completed and clomethiazole was discontinued. With this first questionnaire, the patient's sleep quality of the 4 weeks prior to the hospitalisation was captured. To assess sleep quality during inpatient detoxification treatment after alcohol and, where applicable, clomethiazole were withdrawn; the PSQI was filled out a second time immediately prior discharge. The average treatment took between 12 and 16 days, but could last longer in case of persisting withdrawal symptoms or particularly severe general condition.

Patients who failed to give complete responses to all items were excluded from analysis, as well as all patients that dropped out from treatment and refused to fill out the second

questionnaire before leaving the hospital. A PSQI score of greater than five was used to indicate bad sleep quality.

2.3. Data Analysis. Statistical analyses were carried out using SAS Version 9.4 (Statistical Analysis System) software by the SAS Institute. Changes between PSQI scores from admission to discharge were calculated using a t-test for paired observations. For nominal and ordinal scaled variables, the analysis was carried out with the log likelihood chi square test. For interval scaled data, the relationship between the respective variable and premature discharge was analysed with a t-test for independent samples (if normal distribution was assumed) or with a Wilcoxon 2-sample test (if normal distribution could not be assumed). Normal distribution was tested using the Kolmogorov-Smirnov test with a two-sided significance level of $p < 0.01$. Tests on group differences were examined with a two-sided significance level of $p < 0.05$. General Linear Models were used to assess the predicting power of age, duration of dependency, and the dichotomous variable patient sex on sleep quality at admission and at discharge. For the individual changes of sleep quality from admission to discharge, the PSQI at admission and whether patients dropped out from treatment or not were additionally considered as independent variables.

3. Results

3.1. Sample Characteristics. The total number of patients who participated in this study was 77 of whom 76.6% (59) were males. The mean age of the patients was 47.7 (± 12.2) years with a range from 20 to 73 years. Males and females did not differ significantly in age (males: 48.4 ± 11.4 years; females: 45.4 ± 14.8 years, $p = 0.4162$). Half of the sample (52.0%) suffered from addiction for more than 15 years. The mean addiction duration was 16.6 (± 10.8) years. On average males suffered significantly longer ($p = 0.0458$) from addiction than females (males: 18.0 ± 10.9 years; females: 12.3 ± 9.2 years). 38 (49.4%) patients had to be treated with clomethiazole at tapered dosage for up to 3 days. Another sedative medication was not applied.

3.2. Sleep Quality of the Sample. At admission, a total of 54 (70.1%) of the 77 patients had bad sleep quality as indicated by a PSQI score greater than five. At discharge, the quantity of patients with sleep disturbance (PSQI > 5) fell to 59.7% ($N = 46$). Sleep quality of the entire sample thus improved significantly by 2.0 ± 4.8 score units ($p = 0.0006$). Mean PSQI at admission measured $9.1 (\pm 4.6)$ and fell to $7.1 (\pm 3.6)$ at discharge and hence improved by 22.0%. Improvement of sleep was not significantly different for male and female patients ($p = 0.7306$). We found no significant differences for the PSQI score at admission for men (9.3 ± 4.82) and women (8.6 ± 3.8 , $p = 0.6552$) and for the PSQI score at discharge (women: 6.7 ± 3.9 ; men: 7.3 ± 3.52 , $p = 0.5780$). The proportion of bad sleepers (those with a PSQI score > 5) was not statistically significant between men and women, neither at admission ($p = 0.8238$) nor at discharge ($p = 0.6802$). During detoxification, sleep quality improved in 61.0% of the patients which is reflected in decreases of the PSQI score

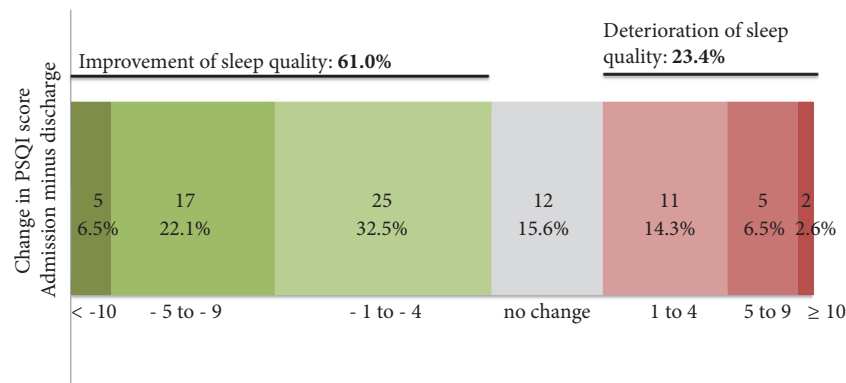


FIGURE 1: Change of PSQI score during detoxification treatment.

TABLE 1: Univariate statistics of PSQI score at admission and discharge.

	mean \pm SD	mean \pm SD	p	effect size ¹
Sex	Female (n = 18)	Male (n = 59)		
PSQI Admission	8.6 \pm 3.8	9.3 \pm 4.8	0.6552	0.14
PSQI Discharge	6.7 \pm 3.9	7.3 \pm 3.5	0.5780	0.15
PSQI Δ	-1.9 \pm 4.5	-2.0 \pm 5.0	0.7306	0.02
Treatment drop-out	Yes (n = 5)	No (n = 72)		
PSQI Admission	11.0 \pm 7.0	9.0 \pm 4.4	0.4309	0.44
PSQI Discharge	8.2 \pm 2.6	7.1 \pm 3.6	0.3499	0.32
PSQI Δ	-2.8 \pm 6.9	-1.9 \pm 4.7	0.7243	0.18
Duration of dependence	≤ 15 (n = 37)	> 15 (n = 40)		
PSQI Admission	9.9 \pm 5.4	8.3 \pm 3.6	0.1692	0.36
PSQI Discharge	7.4 \pm 4.0	6.9 \pm 3.2	0.6085	0.41
PSQI Δ	-2.5 \pm 5.2	-1.5 \pm 4.5	0.4014	0.23

¹ Effect size: small effect, $0.2 < d \leq 0.5$; medium, $0.5 < d \leq 0.8$; large, $d > 0.8$.

up to 12 units of score. In 23.4% sleep quality deteriorated as reflected by an increase of the PSQI score up to 11 units (Figure 1). The PSQI did not change during detoxification treatment in 15.6% of the patients.

With regard to the classification of the patients into good or poor sleepers, 68.8% did not change their classification. 19.5% of the patients remained good sleepers while 49.4% persisted to be poor sleepers. Nevertheless, 20.8% of the patients converted from poor to good sleepers, while 10.4% of the good sleepers became poor sleepers during detoxification treatment.

3.3. Univariate Analysis of the Change of Sleep Quality during Detoxification Treatment. To further assess the change in sleep quality during qualified detoxification treatment, the PSQI on admission and at discharge as well as individual changes were analysed with regard to patient sex, treatment outcome (regular termination versus unplanned treatment drop-out), and duration of dependency (≤ 15 years or > 15 years). The results of the univariate analysis are summarized in Table 1. There were no significant differences in sleep quality as assessed by the PSQI between male and female patients, neither at admission, nor at discharge nor at the level of individual changes. Effect sizes were negligible.

In this study, five patients (6.5%) prematurely dropped out of treatment. On average, patients that dropped out had higher PSQI values at admission as well as at discharge compared to the patients that completed detoxification treatment successfully. Although not significantly different, the patients with completed treatment had improved sleep by 1.1 score units more than the patients that prematurely dropped out of treatment. Effect size for differences at admission and discharge was small. Duration of dependency did not affect sleep quality at admission and at discharge nor did the duration of dependency affect the change during detoxification. Again, the effect sizes were small (< 0.50).

3.4. Regression Analysis on the Influence of Age on Sleep Quality during Detoxification. In addition to the effect of sex, treatment outcome and duration of dependency on sleep quality during qualified detoxification treatment, we further analysed a possible influence of age on sleep quality during detoxification treatment. Regression analysis showed that the mean PSQI at discharge was about 2 points lower than PSQI at admission irrespective from the patient's age ($p = 0.7101$; Figure 2).

3.5. Regression Analysis of the Change in PSQI in relation to PSQI at Admission. Figure 3 shows the regression analysis

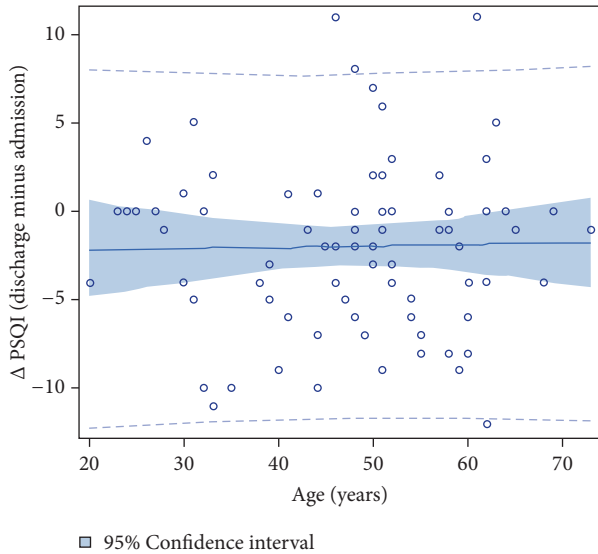


FIGURE 2: **Plot of changes in the PSQI score from admission to discharge by age.** Regression: $\Delta\text{PSQI} = -2.3 + 0.007 * \text{age}$ ($p = 0.8785$; $R^2 = 0.0003$).

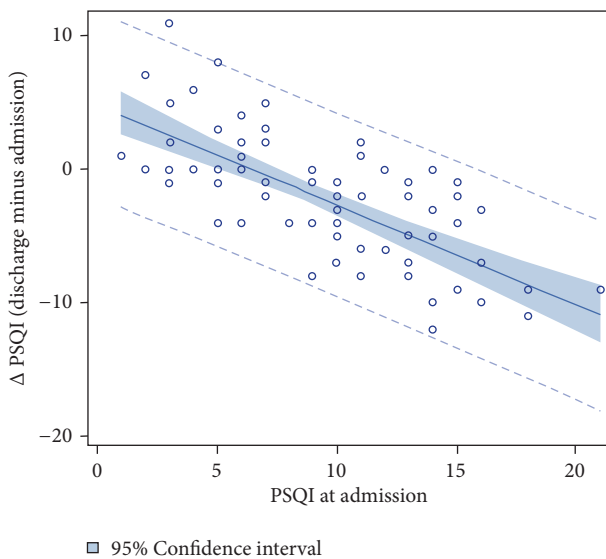


FIGURE 3: **Regression analysis of the change in PSQI in relation to PSQI at admission.** Regression: $\Delta\text{PSQI} = 4.9 - 0.752 * \text{PSQI at admission}$ ($p < 0.0001$; $R^2 = 0.5096$).

of the PSQI change after detoxification treatment in relation to the PSQI at admission. Patients with low or no sleep disturbances at admission did not or only slightly improve their sleep. Whereas patients with bad sleep on admission, indicated by higher PSQI scores, improved sleep quality significantly ($p < 0.0001$), patients with a better sleep at admission did not improve their sleep as much as patients with pronounced bad sleep quality during detoxification treatment. The worse the sleep quality at admission, the more considerably was the revealed improvement. Overall sleep quality at admission explained 51.0% of the change in the PSQI score from admission to discharge.

3.6. *General Linear Model for Prediction of PSQI at Admission, Discharge, and PSQI Change during Treatment.* Finally, a general model with age, sex, and duration of dependency was calculated to identify correlates of sleep quality at admission and at discharge as assessed by the PSQI score (Table 2). Analyses revealed that none of these factors predicted PSQI at admission significantly (all partial $\eta^2 < 0.06$). Overall the model was not statistically significant ($p = 0.2234$) and predicted less than 6% of the variation of the PSQI score at admission. For the PSQI score at discharge the variables age, sex, and duration of dependency were again not statistically significant ($p = 0.4216$). For the change in PSQI from admission to discharge two additional factors were included in the analysis: the PSQI at admission and whether the patient dropped out from treatment or not. The model explained 51.9% of the change in the PSQI score, with the PSQI at admission ($p < 0.0001$, $\eta^2 = 0.514$) being a significant predictor.

4. Discussion

The aim of the present study was to examine sleep quality after physical withdrawal from alcohol during inpatient qualified detoxification treatment in alcohol dependent patients. The main findings of our study were as follows. (1) Male and female patients were equally affected by sleep disturbances and improvement of sleep was not affected by the patient's sex. (2) Sleep quality was independent of age and duration of dependency. (3) During detoxification, sleep quality slightly improved in 61% of the patients. (4) Nevertheless, 68.8% did not change their classification as good respectively poor sleepers. (5) When discharged, the PSQI score of patients who prematurely dropped out of treatment did not significantly differ from the PSQI score of patients who completed detoxification treatment successfully. Thus, the PSQI score was not a predictor for unplanned treatment drop-out. (6) PSQI score at admission was a significant predictor of the change of sleep quality during detoxification treatment.

70% of our patients reported sleep disturbances at admission indicated by a PSQI score greater than five. This finding meets our expectations as corresponding numbers were reported in literature. Roncero et al. [14] found insomnia in 71% of the patients admitted for alcohol detoxification whereas Escobar-Córdoba et al. [23] even reported rates of 89% (men) and 100% (woman) of patients with PSQI scores >5 , respectively. There were no differences in sleep quality between male and female patients. Data about the effect of the patient's sex on sleep quality during detoxification is inconsistent. Past research of Kolla et al. [16] is in accordance with our study whereas others [24] found that insomnia during early alcohol recovery was predicted by female gender. In the general population in turn, insomnia symptoms are more frequently in women than men [25, 26]. Our results are limited by the fact that only 23% of our patients were female. Further investigation should be carried out to verify the influence of the patient's sex on sleep quality during alcohol detoxification.

In the present work, 60% of the patients still had sleep disturbance at discharge; however, sleep quality improved

TABLE 2: General linear model for prediction of PSQI at admission, discharge, and PSQI change during treatment.

Factor	PSQI at admission		PSQI at discharge		Δ PSQI (discharge – admission)	
	p	Partial η^2	p	Partial η^2	p	Partial η^2
Age	0.1401	0.030	0.1813	0.024	0.3453	0.013
Sex	0.3594	0.012	0.4183	0.009	0.5694	0.005
Duration of dependency	0.0446	0.054	0.1296	0.031	0.3221	0.014
Treatment drop-out (yes/no)	N/A	N/A	N/A	N/A	0.6319	0.003
PSQI at admission	N/A	N/A	N/A	N/A	< 0.0001	0.514
Pr > F	$F_{(3;73)} = 1.49$ 0.2234		$F_{(3;73)} = 0.95$ 0.4216		$F_{(5;71)} = 15.35$ < 0.0001	
R ²	0.0578		0.0375		0.5194	

N/A = not applicable.

in 61% of the patients. Although sleep problems have been found to persist long after withdrawal [13], patients might have benefitted from relearning to maintain a regular daily structure during their hospitalization, which often got lost during years of addiction. In nearly one-quarter of our patients a deterioration of sleep was observed which again can be explained by the negative impact of withdrawal on sleep. Additionally, it can be concluded that sleep might have been disrupted by room neighbours and the unfamiliar environment in hospital, which both might have contributed to a decrease of sleep quality. It does not surprise that almost 68.8% of our patients did not change their classification as the mean decrease of the PSQI score was only 2 score points at the individual level. Moreover, detoxification happens in an early stage in the long process of recovery. As sleep problems maintain in the first weeks of abstinence, it can be assumed that a further improvement could have been observed over time, as the average duration of detoxification treatment of two weeks was not long enough to improve sleep. As sleep disturbance constitutes a major risk factor for relapse [27], inpatient detoxification treatment might be enriched with programs teaching knowledge how to improve sleep without the use of medication to strengthen patients to revise sleep habits and correct misconceptions about sleep and insomnia. Interestingly, in our study, the reduction of PSQI score after detoxification did not differ significantly between patients that completed treatment regularly and patients that dropped out prematurely from treatment. Descriptive statistics indicate that improvement in sleep is approximately 0.9 score units higher in treatment drop-outs (-2.8) than in those patients who regularly completed the detoxification program (-1.9). However, this difference is not statistically significant. This might be due to the small sample size of patients who dropped out and for which PSQI data are available. The drop-out rate in this study was remarkably low (6.5%) compared to previous studies reporting drop-out rates of 30% [28, 29]. This discrepancy might be explained by the fact that study participation was voluntary and that mainly highly motivated patients participated in this study. It can be assumed that patients with high risk of unplanned drop-out, e.g., due to missing therapy motivation or decreased

frustration tolerance, were not willing to participate in our study at all. Furthermore, patients that missed to fill out the PSQI at discharge due to treatment drop-out were excluded from data evaluation. Only data from patients that completed both questionnaires were taken into consideration. Nevertheless, patients that dropped out of treatment had poorer PSQI values compared to patients that completed detoxification treatment. It is conceivable that the improvement of sleep quality during withdrawing did not fulfil the patient's expectations and weakened their therapy motivation.

In our study, duration of dependency and age did not predict sleep quality during detoxification. These results suggest that alcohol has an effect on sleep disturbances independent of duration of use and age. It can be assumed that age-related factors like life experience and profound knowledge of the patient's addiction disease do not enable patients to influence or tolerate impaired sleep quality. Nevertheless, substance use disorders and in consequence sleep disorders can be influenced by the stage of development [2] but could not be shown in our study as only one out of 77 patients was younger than 21 years. PSQI score at admission was found to predict the PSQI score change during detoxification. Our findings might be an indication that the PSQI at admission might serve as indicator for addiction severity and in turn as indicator for the extent of the overall influence of the imminent detoxification on sleep. It is plausible that patients with a low PSQI score at admission do not improve to the same extent as patients with severely impaired sleep physiology.

This study has some limitations. Sleep quality was only observed at the beginning and the end of the detoxification treatment but not beyond. Additional long-term observations in the weeks after inpatient treatment shall complete the picture of sleep disturbances in addiction treatment. Furthermore, all assessments of sleep quality evaluated in this study were based on patient self-report. The present study does not allow corroboration of the patient's statements made in the questionnaire. In view of the above, additional research enriched with polysomnographic studies supporting the patient's subjective statements made in the PSQI and studies to include the collection of the patient's withdrawal state (e.g.,

the severity of alcohol withdrawal symptoms according to the CIWA withdrawal score [30]) shall be conducted.

Finally, information about medical conditions or medications that might contribute to insomnia was not obtained. However, different from other institutions, no benzodiazepines were administered to the patients during alcohol detoxification. It is unlikely, but conceivable, that the administration of clomethiazole distorted our results, at least for the 38 patients, were alcohol withdrawal symptoms that had to be treated with clomethiazole. However, half-life-time of clomethiazole is short (3 hours), so that this might certainly not have affected the PSQI at discharge. If there was a considerable impact of clomethiazole on sleep quality, one would have not seen an improvement of sleep quality at discharge.

In summary, insomnia was highly prevalent in the patients included in this study, at admission but also upon discharge from hospital. Overall, sleep quality was slightly improved in most patients following two weeks of qualified detoxification treatment but anyhow remained in 59.7% of the patients. In the light of these findings, patients may require individual evaluation of sleep quality and insomnia-specific treatment in the course of detoxification therapy. Further studies addressing this promising issue are mandatory.

Data Availability

The underlying data related to our manuscript can be made available by the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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8. LEBENSLAUF

Mein Lebenslauf wird aus datenschutzrechtlichen Gründen in der elektronischen Version meiner Arbeit nicht veröffentlicht.

9. KOMPLETTE PUBLIKATIONSLISTE

Sofin Y, Danker-Hopfe H, Gooren T, Neu P. Predicting Inpatient Detoxification Outcome of Alcohol and Drug Dependent Patients: The Influence of Sociodemographic Environment, Motivation, Impulsivity, and Medical Comorbidities. *J Addict*; Volume 2017 (2017)

<https://doi.org/10.1155/2017/6415831>

Impact Factor: Nicht verfügbar für Journal of Addiction

Sofin Y, Danker-Hopfe H, Neu P. The Effect of Significant International Sports Events on Qualified Detoxification Treatment Outcome - Do Drop-Out Rates Change during UEFA European Championship? *PLOS ONE* 11(12) (2016)

<https://doi:10.1371/journal.pone.0167446>

Impact Factor: 2.766

Neu P, Sofin Y, Danker-Hopfe H. The effect of detoxification on sleep: How does sleep quality change during qualified detoxification treatment? *J Addict*; Volume 2018 (2018)

<https://doi.org/10.1155/2018/9492453>

Impact Factor: Nicht verfügbar für Journal of Addiction

10. DANKSAGUNG

Ich möchte mich herzlich bei Herrn Dr. Peter Neu für die Überlassung des spannenden Themas und die sehr gute Betreuung bedanken. Ganz besonders danke ich Ihnen, dass Sie es mir ermöglicht haben von Frankfurt aus zu promovieren, so dass ich meinem Beruf weiterhin nachgehen konnte. Danke, dass Sie an mich geglaubt haben!

Auch Frau Prof. Dr. Heidi Danker-Hopfe danke ich sehr für Ihre fachliche Unterstützung bei meinen Publikationen und damit meiner Promotion.

Meinen Eltern danke ich für meine Ausbildung und dass sie es mir ermöglicht haben zu studieren.

Ein besonderer Dank gilt meinem Freund Tobias für all die Liebe und Unterstützung während der Entstehung dieser Promotionsschrift und weit darüber hinaus.