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گزارش نهایی طرح تحقیقاتی

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عنوان:

ایجاد و توسعه نظام ثبت بیماران مسموم با انواع مسمومیت های حاد در مرکز آموزشی

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راهنما

لطفا این بخش را به دقت مطالعه فرمایید و پس از تکمیل گزارش آن را حذف کنید. راهنما فقط برای اطلاع شماست و

گزارش نهایی که ارسال می شود نباید شامل این بخش باشد.

این فرم به منظور تسهیل ارائه گزارش نهایی طرح های تحقیقاتی تدوین شده است. چنانچه مقالات منتج از طرح، در برگیرنده اطلاعات مناسبی از دستیابی به اهداف اولیه در نظر گرفته شده برای مطالعه هستند، در این فرم فقط خلاصه ای از روش مطالعه و نتایج ذکر می شود و برای اطلاعات بیشتر خواننده به مقالات منتشر شده ارجاع داده می شود. در شرایطی که نتایج در مقالات منتشر شده بازگو نشده اند یا در زمان ارائه گزارش نهایی، مقالات منتشر نشده اند لازم است گزارش به صورت مبسوط نگاشته شود. در هر حال، پژوهشگران ارجمند باید توجه داشته باشند که انتشار نتایج تحقیق و اشتراک آنها با جامعه علمی و پاسخگویی به مرجع حمایت کننده بخش لاینفکی از فرایند پژوهش است و از این رو، تکمیل این فرم با اطلاعات دقیق، کامل و گویا حائز اهمیت است. همچنین، در صورتی که به هر دلیل مطالعه به بخشی از اهداف از پیش تعیین شده دست نیافته است، ذکر فرایند اجرا، ارائه و تفسیر نتایج دور از انتظار یا دلایل عدم موفقیت باید به صورت مبسوط نوشته شود تا امکان استفاده از این تجربیات برای سایر پژوهشگران فراهم شود.

شایان ذکر است، این فرم فقط برای ارائه گزارش نهایی طرح های تحقیقاتی غیر پایان نامه ای به کار می رود و تدوین پایان نامه ها بر اساس ضوابط و راهنماهای جداگانه ای است که قبلاً اعلام شده است. خواهشمند است در تهیه گزارش نهایی مطالب زیر را مورد توجه قرار دهید:

الف. بخش های گزارش:

صفحه بسم الله الرحمن الرحيم: عبارت بسم الله الرحمن الرحيم در وسط صفحه قرار گرفته و از به کار بردن هر گونه کادر تزئینی خودداری شود.

صفحه عنوان به فارسی: آرم دانشگاه، شماره طرح، عنوان طرح، مجری طرح، همکار(ان) طرح، تاریخ پایان طرح.

چکیده فارسی: چکیده فارسی به صورت ساختاریافته و در یک صفحه شامل عنوان، مقدمه، مواد و روش ها، یافته ها، نتیجه گیری، و کلیدواژه ها بوده و حداکثر تا ۳۰۰ کلمه معنی دار (بدون محاسبه حروف ربط و اضافه) تهیه شود. زمان کلیه افعال در هدف، مواد و روش ها و یافته های چکیده، گذشته می باشد. تعداد کلیدواژه ها بین ۴ تا ۷ می باشد که به ترتیب الفبایی درج و به وسیله ویرگول از همدیگر جدا می شوند.

متن گزارش نهایی: ساختار خلاصه گزارش نهایی شامل مقدمه، بیان مساله و ضرورت انجام پژوهش، اهداف پژوهش، روش اجرا، یافته ها، بحث و نتیجه گیری می باشد.

فهرست منابع: منابع بایستی بر اساس الگوی ونکوور و به زبان انگلیسی تنظیم شود. کلیه منابع باید توسط یکی از نرم‌افزارهای مدیریت منابع نظیر Endnote تهیه شود.

مقالات منتشر شده از نتایج پژوهش: شامل آدرس مقاله و لینک آن در داده پایگاه نمایه کننده

چکیده انگلیسی: چکیده انگلیسی باید دقیقاً ترجمه چکیده فارسی به زبان انگلیسی باشد. به عبارت دیگر، متن و قالب چکیده انگلیسی باید عیناً مانند چکیده فارسی باشد.

صفحه عنوان به انگلیسی: اطلاعات مندرج در این صفحه، و فاصله‌ها باید عیناً مانند صفحه عنوان فارسی می‌باشد.

ب. شیوه نگارش و تایپ

اندازه حاشیه‌ها: سمت راست ۳، سمت چپ ۲/۵، بالای صفحه ۳، پایین صفحه: ۳ سانتی‌متر

فاصله سطرها در تمامی متن برابر ۱/۱۵ سانتی‌متر است.

تمامی جدول‌ها، نمودارها و شکل‌ها باید دارای شماره و عنوان باشند. شماره و عنوان جدول‌ها در بالای آنها و شماره و عنوان نمودارها و سایر شکل‌ها در زیر آنها نوشته می‌شود.

شماره‌گذاری پانویس‌ها در هر صفحه به صورت مستقل انجام می‌شوند.

در تمام متن، روش استناددهی بر اساس شیوه‌نامه ونکوور می‌باشد. کلیه منابع مورد استفاده به ترتیب استناد و ظهور در متن، با استفاده از اعداد، در داخل پرانتز شماره‌گذاری می‌شوند.

قلم نگارش متن بر اساس جدول زیر می‌باشد:

نوع متن	قلم	اندازه
متن اصلی فارسی	B Nazanin	۱۴
عنوان جدول یا شکل	B Nazanin (Bold)	۱۲
متن داخل جدول	B Nazanin	حداکثر ۱۲
چکیده فارسی	B Nazanin	۱۲
چکیده انگلیسی	Times New Roman	۱۲
عنوان چکیده انگلیسی	Times New Roman	۱۳
پانویس فارسی	B Nazanin	۱۰
پانویس انگلیسی	Times New Roman	۸
فهرست منابع انگلیسی	Times New Roman	۱۲

ج. روش ارسال گزارش

۱ نسخه الکترونیکی گزارش تکمیل شده را به صورت یک فایل Word از طریق سامانه پژوهشیار به معاونت تحقیقات و
۲ فناوری دانشگاه ارسال می‌گردد.

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عنوان: ایجاد و توسعه نظام ثبت بیماران مسموم با انواع مسمومیت های حاد در مرکز آموزشی

درمانی خورشید

چکیده

مقدمه: مسمومیت حاد یکی از علل شایع بستری شدن و مرگ در بیمارستان ها در کشورهای در حال توسعه است. با توجه به ماهیت متنوع موارد مسمومیت در محیط های مختلف اپیدمیولوژیک و اجتماعی-اقتصادی، انجام تحقیقات بیشتر برای ارزیابی الگوهای مسمومیت و عوامل مرتبط با آن در مرکز ایران توصیه می شود. یک سیستم ثبت داده ها در مرکز اورژانس مسمومیت بیمارستان خورشید (KHPEC)، مرکز ارجاع اصلی موارد مسمومیت در مرکز ایران، پیاده سازی شد.

روش ها: فرآیند جمع آوری داده ها شامل مراحل زیر است: الف) بستری شدن در بیمارستان، ب) اخذ شرح حال، انجام معاینه فیزیکی و همچنین بررسی های آزمایشگاهی، ج) تثبیت وضعیت بیماری، د) اطلاع به کارشناس ثبت، ه) ورود داده ها به سیستم، ز) تأیید کارشناس ناظر، ح) کنترل کیفیت داده ها، و) آماده سازی برای تجزیه و تحلیل.

یافته ها:

مقاله شماره ۱:

موضوع: بررسی اپیدمیولوژیک بیماران بستری در مرکز اورژانس مسمومیت ارجاعی: طراحی و روش شناسی یک مطالعه مقطعی بزرگ

چکیده

مقدمه: مسمومیت حاد یکی از علل شایع بستری شدن و مرگ در بیمارستان ها در کشورهای در حال توسعه است. با توجه به ماهیت متنوع موارد مسمومیت در محیط های مختلف اپیدمیولوژیک و اجتماعی-اقتصادی، انجام تحقیقات بیشتر برای ارزیابی الگوهای مسمومیت و عوامل مرتبط با آن در مرکز ایران توصیه می شود. یک سیستم ثبت داده ها در مرکز اورژانس مسمومیت بیمارستان خورشید (KHPEC)، مرکز ارجاع اصلی موارد مسمومیت در مرکز ایران، پیاده سازی شد.

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نتایج: در این مطالعه، در مجموع ۴۲۹۷ بیمار از ماه مه ۲۰۲۴ تا مه ۲۰۲۵ توسط سیستم ثبت داده‌ها ثبت شدند. میانگین سنی شرکت‌کنندگان ۳۳،۰۶ سال (انحراف معیار = ۱۴،۹۸، از ۱ تا ۱۰۲) بود که ۴۷،۸٪ آنها زن بودند. مسمومیت دارویی بیشترین موارد (N=2020, 47.0%) و پس از آن مواد افیونی (N=789, 18.4%)، مسمومیت با مواد متعدد (N=574, 13.4%)، الکل‌ها (N=223, 5.2%) و آفت‌کش‌ها (N=210, 4.9%) را تشکیل می‌دادند. شایع‌ترین نوع مواجهه، عمدی (۷۷،۲٪) بود. بلع دهانی شایع‌ترین راه مواجهه (۸۸،۵٪) بود. ۸،۵٪ از کل بیماران بستری در بخش مراقبت‌های ویژه و ۰،۸٪ از بیماران ما در طول بستری در بیمارستان فوت کردند. نتیجه‌گیری: KHPEC فرصتی برای نظارت مداوم و تصمیم‌گیری مبتنی بر شواهد در پیشگیری و درمان مسمومیت فراهم کرد.

کلمات کلیدی: اپیدمیولوژی، مسمومیت، ثبت‌ها، مدیریت داده‌ها

مقدمه

سم ماده‌ای است که می‌تواند از طریق بلع، استنشاق یا تماس پوستی به موجودات زنده آسیب برساند (۱). منابع سم شامل داروها، ترکیبات شیمیایی، گیاهان، زباله‌های صنعتی و مواد غذایی است (۲). در کشورهای صنعتی، مواد شیمیایی خانگی و داروها از علل اصلی مسمومیت هستند، در حالی که در کشورهای در حال توسعه، مواد شیمیایی کشاورزی مانند آفت‌کش‌ها شایع‌تر هستند (۳، ۴).

مسمومیت حاد بار قابل توجهی را بر جامعه و سیستم‌های مراقبت‌های بهداشتی تحمیل می‌کند (۵). این مسمومیت با علائم سریعی که در عرض ۲۴ ساعت پس از مواجهه رخ می‌دهد، مشخص می‌شود (۶). در سطح جهانی، مسمومیت حاد به دلیل اقدامات عمدی مانند خودکشی و مواجهه غیرعمدی، یک نگرانی عمده است. سازمان بهداشت جهانی (WHO) سالانه بیش از ۲۰۰۰۰۰ مرگ را گزارش می‌کند که بیش از ۸۴٪ آن در کشورهای کم درآمد و متوسط به دلیل مسمومیت حاد رخ می‌دهد (۷). کودکان به ویژه آسیب‌پذیر هستند و بیش از ۸۴۰۰۰ مرگ به مسمومیت‌های غیرعمدی نسبت داده می‌شود (۸-۱۱).

مسمومیت حاد یکی از علل اصلی بستری شدن در بیمارستان و مرگ در کشورهای در حال توسعه مانند ایران است (۱۲). یک مطالعه افزایش ۱۰ ساله موارد مسمومیت در ایران را نشان داد (۱۳)، که مسمومیت با دارو شایع‌ترین علت آن است (۱۴). مسمومیت با تریاک نیز در ایران شایع است (۱۵)، همراه با سایر مواد مانند آرام‌بخش‌ها، مواد افیونی و آفت‌کش‌ها (۱۶). درک الگوی کلی موارد مسمومیت حاد در مناطق مختلف به دلیل ماهیت متنوع موارد مسمومیت در مناطق مختلف اپیدمیولوژیک و اجتماعی-اقتصادی بسیار مهم است. این دانش می‌تواند منجر به درک بهتر الگوها، بهبود مدیریت بیمار و برنامه‌ریزی مؤثرتر برای کاهش بیماری شود (۱۷). داده‌های واجد شرایط برای شناسایی علل اصلی مسمومیت حاد و اجرای برنامه‌ریزی پیشگیری ضروری است. بنابراین، یک پایگاه داده اطلاعات مربوط به سموم نقش تعیین‌کننده‌ای در این فرآیند خواهد داشت (۱۸). سیستم‌های ثبت داده‌ها برای بیماران مسموم و سایر بیماری‌ها در حال حاضر در کشورهای توسعه‌یافته و در حال توسعه وجود دارد (۱۹، ۲۰). مطالعه حاضر با هدف ایجاد

یک سیستم ثبت بیمارستانی برای موارد تشخیص داده شده با مسمومیت حاد و استفاده از این سیستم برای جمع‌آوری و تجزیه و تحلیل سیستماتیک داده‌های اپیدمیولوژیک، بالینی، سم‌شناسی، درمان و پیامدهای مربوط به بیماران مراجعه‌کننده با مسمومیت حاد انجام شد. این سیستم در مرکز اورژانس مسمومیت بیمارستان خورشید (KHPEC) در مرکز ایران پیاده‌سازی شده است.

۲. روش‌ها و مواد

۲.۱ تعریف مورد و معیارهای واجد شرایط بودن

این مطالعه مقطعی در بخش اورژانس مسمومیت بیمارستان خورشید، یک مرکز ارجاع عالی در اصفهان، واقع در بخش مرکزی ایران، انجام شد. تأیید اخلاقی توسط کمیته اخلاق دانشگاه علوم پزشکی اصفهان با کد IR.MUI.MED.REC.1400.097 اعطا شد. رضایت آگاهانه از همه بیماران اخذ شد. معیارهای اخذ رضایت آگاهانه شامل موارد زیر بود: (۱) افشای اطلاعات جامع، (۲) ارزیابی صلاحیت بیمار (یا جایگزین) و (۳) اطمینان از رضایت داوطلبانه. برای حفظ محرمانگی اطلاعات بیمار، همه سوابق به طور ایمن در فایل‌های محافظت شده با رمز عبور ذخیره شدند. این مطالعه از ماه مه ۲۰۲۳ تا مه ۲۰۲۴، به مدت سه سال انجام شد. همه بیمارانی که با مسمومیت حاد مراجعه کرده بودند و در اورژانس، بخش یا بخش مراقبت‌های ویژه مسمومیت بستری شده بودند و همچنین بیمارانی که به دلیل عوارض مرتبط با مسمومیت به بخش‌های دیگر ارجاع داده شده بودند، در این مطالعه گنجانده شدند. بیمارانی که در اورژانس مسمومیت تریاژ شده بودند اما به دلیل تشخیص بیماری‌های غیرمسمومیت مانند مشکلات پزشکی یا عصبی به بخش‌های دیگر منتقل شده بودند، از مطالعه حذف شدند. با توجه به اینکه تقریباً ۷۰۰۰ تا ۸۰۰۰ بیمار هر ساله در اورژانس مسمومیت بستری می‌شوند، حجم نمونه مورد انتظار برای سال‌های مورد تجزیه و تحلیل بین ۳۵۰۰۰ تا ۴۵۰۰۰ پرونده بیمار تخمین زده شد.

۲.۲ طراحی رجیستری

۲.۲.۱ طراحی فرم استخراج داده‌های الکترونیکی برای موارد مسمومیت

در مرحله اولیه، یک بررسی جامع از متون انجام شد تا اطلاعات مربوط به طراحی فرم استخراج داده‌های الکترونیکی و برگه‌های همراه برای اخذ شرح حال پزشکی در موارد مسمومیت جمع‌آوری شود. همچنین از نظرات کارشناسان برای شناسایی تمام اجزای اطلاعات لازم استفاده شد. بررسی متون بر شناسایی عناصر داده‌ای ضروری برای ایجاد رجیستری‌های مسمومیت و توسعه یک مجموعه داده مسمومیت متمرکز بود. یک مجموعه داده طی جلسات متعدد با چهار متخصص سم‌شناسی بالینی تعیین شد. برای نهایی کردن استخراج داده‌های الکترونیکی برای رجیستری مسمومیت، فرم‌های حاوی عناصر داده‌ای مسمومیت به ۱۰ متخصص سم‌شناسی، طب اورژانس و اپیدمیولوژی داده شد.

۲.۲.۲ توسعه سیستم ثبت داده‌ها

یک پلتفرم ثبت آنلاین، امن و مبتنی بر وب تحت نظارت و مجوز دانشگاه علوم پزشکی اصفهان توسعه داده شد. این سیستم به محققان اجازه می‌دهد تا از هر مکانی و در هر زمانی ثبت نام کنند، به گزارش‌های قابل صدور دسترسی داشته باشند و امنیت پلتفرم اطلاعات را حفظ کنند.

۲,۲,۳ مطالعه آزمایشی سیستم ثبت مرکز مسمومیت

برای ارزیابی قابلیت استفاده، عملکرد فنی، دقت، کاربرپسندی و سهولت ورود، یک مطالعه آزمایشی با استفاده از ۲۰ پرونده بیمار که توسط دو کارمند آموزش دیده ورود اطلاعات بررسی شده بود، انجام شد. بازخورد حاصل از مطالعه آزمایشی، تنظیماتی را در طراحی فرم و عملکرد سیستم قبل از اجرای کامل هدایت کرد.

۲,۲,۴ ثبت اطلاعات بیماران مسموم مراجعه‌کننده به بیمارستان

این مطالعه از ماه مه ۲۰۲۳ ادامه داشت. فرآیند تحقیق از یک توالی ساختاریافته پیروی کرد تا از دقت و کامل بودن جمع‌آوری و ورود داده‌ها اطمینان حاصل شود. پس از پذیرش بیمار در بیمارستان، کارورزان پزشکی اطلاعات سابقه پزشکی را جمع‌آوری و در برگه‌های پذیرش از پیش قالب‌بندی شده ثبت کردند. هر بیمار تحت ارزیابی بالینی جامع، شامل شرح حال دقیق، معاینه فیزیکی و بررسی‌های آزمایشگاهی لازم قرار گرفت. پزشکان معالج بر اساس شرح حال گزارش شده توسط بیمار یا خانواده، تظاهرات بالینی، آزمایش‌های سم‌شناسی سرم/خون و در صورت نیاز، تجزیه و تحلیل سم‌شناسی ادراری، مسمومیت را تشخیص دادند.

پس از تثبیت اولیه و مدیریت پزشکی، کارکنان آموزش‌دیده تحقیقاتی با مدرک کارشناسی ارشد سم‌شناسی یا فناوری اطلاعات سلامت، اطلاعات را در سیستم ثبت الکترونیکی وارد کردند.

اطلاعات توسط یک متخصص ناظر بررسی و تأیید شد تا از مطابقت با سوابق پزشکی اصلی اطمینان حاصل شود. یک فرآیند کنترل کیفیت برای شناسایی و اصلاح هرگونه داده مفقود یا متناقض انجام شد.

پس از ورود داده‌های یک ساله به ثبت، یک بررسی کامل برای اطمینان از کامل بودن و دقت انجام شد. در روزهایی که ورود داده‌ها ناقص بود، پرونده‌های مربوط به بیماران را دوباره بررسی کردیم و جزئیات از دست رفته را به سیستم ثبت اضافه کردیم. مجموعه داده‌های نهایی صادر و برای تجزیه و تحلیل آماری جهت پشتیبانی از اهداف مطالعه آماده شد.

۲,۳ مجموعه داده‌های ثبتی: متغیرها و روش‌های جمع‌آوری داده‌ها

فرم استخراج داده‌های الکترونیکی مورد استفاده برای جمع‌آوری داده‌ها بر اساس اطلاعات بازبایی شده به چهار بخش تقسیم شد.

متغیرهای جمعیت‌شناختی

بخش اول شامل داده‌های اپیدمیولوژیک و جمعیت‌شناختی مانند سن، جنس، شغل، قومیت، قد، وزن، محل و کشور تولد، آدرس منزل و محل کار، نوع بیمه، ایمیل، شماره تلفن همراه، وضعیت اشتغال و ملیت، زمان بستری و ترخیص، مدت بستری در بیمارستان، تعداد فرزندان، نوع پذیرش، منبع اخذ شرح حال (گزارش خود بیمار، گزارش خانواده یا همراه) بود.

متغیر سم‌شناسی

بخش دوم شامل ویژگی‌های سم‌شناسی مانند شکایت اصلی، زمان بین مصرف مواد و بستری در بیمارستان، نوع آفت‌کش‌ها (علف‌کش‌ها، حشره‌کش‌ها، قارچ‌کش‌ها، جونده‌کش‌ها و کنه‌کش‌ها)؛ دسته دارویی، شامل داروهای ضد افسردگی، ضد روان‌پریشی، آرام‌بخش-خواب‌آور، ضد تشنج، داروهای کاهنده قند خون، مسکن‌ها، مواد مخدر، محرک‌ها و روان‌گردان‌ها؛ سایر مواد مانند گازهای سمی، گیاهان سمی، الکل‌ها، مواد خانگی و گزش‌ها؛ محل مسمومیت (محلی که مسمومیت در آن رخ داده است)؛ نوع مواجهه (عمدی، تصادفی، ناشی از دیگری (ناآگاه) یا ناشناخته)؛ راه مواجهه (خوراکی، پوستی، استنشاقی، وریدی، مواجهه چندگانه، سایر انواع مواجهه و ناشناخته)؛ سابقه پزشکی قبلی بیمار (بیماری‌های قلبی، ریوی، کبدی، عصبی، فشار خون بالا، دیابت و سایر موارد)؛ سابقه مصرف مواد مخدر، سابقه سلامت روان، تحت درمان روانپزشکی، سابقه اعتیاد، هرگونه سابقه خودکشی در فرد یا خانواده درجه یک، سابقه سوء پیشینه، سابقه خودآزاری.

متغیر بالینی

بخش سوم شامل معاینه فیزیکی هنگام پذیرش مانند علائم حیاتی هنگام پذیرش، مقیاس کمای گلاسکو، رفلکس مردمک، اندازه مردمک، نیستایگموس و هرگونه ناهنجاری در معاینه پوست، قلب، ریه، دستگاه گوارش و عصبی هنگام پذیرش بود.

متغیر تشخیصی و درمانی

بخش چهارم شامل مواردی مانند اقدامات تشخیصی و درمانی انجام شده و پیامد مانند غربالگری سم‌شناسی ادرار، سایر آزمایش‌های سم‌شناسی (مانند سالیسیلات، استامینوفن، سدیم والپروات، لیتیوم، آهن، دیگلوکسین، متانول، فنوباربیتال و غیره)، شستشوی معده، زغال فعال، شستشوی کامل روده و ملین‌ها؛ تکنیک‌هایی برای افزایش دفع سموم از جمله دیورز قلیایی، همودیالیز، هموپرفیوژن و موارد دیگر، پادزهرها، شلاته‌کننده‌ها و استفاده از پادزهر، محل بستری شامل بخش، بخش مراقبت‌های ویژه مسمومیت یا هر دو، لوله گذاری در طول بستری، وضعیت روانی و پیامد (بهبودی، ترخیص با رضایت شخصی، انتقال به بخش‌های دیگر و مرگ و میر در طول بستری) بود. پارامترهای زیر نیز ثبت شدند: آزمایش‌های عملکرد کلیه (اوره و کراتینین)، آزمایش عملکرد کبد (ALT, AST, PT, PTT, INR)، شمارش خون محیطی، سطح گلوکز و الکترولیت خون (سدیم، پتاسیم، کلسیم، منیزیم) و گازسنجی خون

- ۱ ورییدی یا شریانی (HCO_3 , PaO_2 , PCO_2 , pH). سایر آزمایش‌های سم‌شناسی شامل سطح داروهای سرم و
۲ غربالگری سم‌شناسی ادرار در صورت لزوم.
- ۳ ۲,۴ تضمین کیفیت داده‌ها
- ۴ برنامه ثبت کامپیوتری به گونه‌ای طراحی شده است که از ادامه استفاده بدون تکمیل فرآیندهای قبلی جلوگیری کند.
۵ سیستم به کاربران در مورد داده‌های نادرست یا نامناسب هشدار می‌دهد. برای اطمینان از کیفیت داده‌ها، ۱۰٪ از
۶ داده‌های وارد شده دوباره بررسی می‌شوند و یک محقق مستقل برگه‌های داده را بررسی کرده و ۱۰٪ از داده‌های وارد
۷ شده در بسته آماری را با پرونده بیمار تأیید می‌کند.
- ۸
- ۹ ۲,۵ تجزیه و تحلیل آماری
- ۱۰ تحلیل‌های مقدماتی (آمار توصیفی پایه)
- ۱۱ در طول مرحله اولیه ایجاد رجیستری، یک تحلیل توصیفی برای خلاصه کردن ویژگی‌های پایه شرکت‌کنندگان ثبت
۱۲ شده انجام شد.
- ۱۳ • متغیرهای پیوسته بر اساس ارزیابی نرمال بودن با استفاده از آزمون شاپیرو-ویلک به صورت میانگین (انحراف معیار)
۱۴ یا میانه (دامنه بین چارکی) گزارش شدند.
- ۱۵ • متغیرهای دسته‌بندی شده به صورت فراوانی مطلق و درصد برای توصیف الگوهای توزیع ارائه شدند.
- ۱۶ از آنجایی که این مرحله بر ارائه یک نمای کلی از ویژگی‌های شرکت‌کنندگان متمرکز بود، هیچ آزمون آماری
۱۷ استنباطی اعمال نشد. در عوض، نتایج به عنوان خلاصه‌ای اولیه از ترکیب رجیستری عمل می‌کنند و پایه و اساس
۱۸ رویکردهای تحلیلی آینده را تشکیل می‌دهند. تحلیل‌های برنامه‌ریزی شده برای آینده
- ۱۹ تحلیل‌های بعدی، روش‌های آماری استنباطی را برای بررسی ارتباط بین متغیرها و ارزیابی فرضیه‌های کلیدی تحقیق
۲۰ در بر می‌گیرند. این تحلیل‌های برنامه‌ریزی شده شامل موارد زیر است:
- ۲۱ الف. تحلیل‌های مقایسه‌ای:
- ۲۲ • متغیرهای پیوسته:
- ۲۳ ۰ آزمون‌های t مستقل برای متغیرهای با توزیع نرمال استفاده خواهد شد.
- ۲۴ ۰ آزمون‌های U من-ویتنی برای متغیرهای با توزیع غیر نرمال به کار گرفته خواهد شد.

- ۱ • متغیرهای دسته‌بندی شده:
- ۲ O آزمون کای اسکوئر (χ^2) برای بررسی ارتباط بین متغیرهای دسته‌بندی شده استفاده خواهد شد.
- ۳ O آزمون دقیق فیشر ممکن است در مواردی با حجم نمونه کوچک اعمال شود.
- ۴ ب. رگرسیون و مدل سازی پیش‌بینی کننده:
- ۵ • رگرسیون خطی برای متغیرهای پیامد پیوسته.
- ۶ • رگرسیون لجستیک برای پیامدهای دوتایی، با تعدیل عوامل مخدوش کننده.
- ۷ • مدل های خطرات متناسب کاکس برای داده‌های زمان تا رویداد.
- ۸ • مدل های بقای جایگزین مانند مدل های زمان شکست شتاب یافته در صورت نقض مفروضات خطرات متناسب.
- ۹
- ۱۰ ج. تحلیل های همبستگی:
- ۱۱ • همبستگی پیرسون برای متغیرهای با توزیع نرمال.
- ۱۲ • همبستگی اسپیرمن برای متغیرهای غیر نرمال یا داده‌های ترتیبی.
- ۱۳ د. تحلیل حساسیت و زیرگروه‌ها:
- ۱۴ • از تکنیک‌های چندگانه‌ی جایگذاری برای مدیریت داده‌های از دست رفته استفاده خواهد شد.
- ۱۵ • تحلیل‌های طبقه‌بندی شده، تغییرات اثر را در زیرگروه‌های جمعیتی یا بالینی ارزیابی خواهند کرد.
- ۱۶ تمام رویه‌های آماری با استفاده از نرم افزار SPSS و با پیروی از بهترین شیوه‌های تحقیقات اپیدمیولوژیک و آمار
- ۱۷ زیستی انجام خواهد شد تا دقت و تکرارپذیری تضمین شود.
- ۱۸ نتایج
- ۱۹ در این مطالعه، در مجموع ۴۲۹۷ بیمار در سیستم ثبت داده‌ها ثبت شدند. میانگین سنی شرکت کنندگان ۳۳،۰۶ سال
- ۲۰ (انحراف معیار = ۱۴،۹۸، از ۱ تا ۱۰۲) بود که ۴۷،۸٪ آنها زن بودند. جدول ۱ ویژگی‌های جمعیت‌شناختی و
- ۲۱ سم‌شناسی شرکت کنندگان در مطالعه را نشان می‌دهد. اکثر افراد مجرد (۵۰،۶٪) بودند. اکثر بیماران دارای سطح
- ۲۲ تحصیلات دیپلم (۳۴،۱٪) یا زیر دیپلم (۳۸،۶٪) بودند. مسمومیت دارویی بیشترین موارد (۲۰۲۰ نفر، ۴۷،۰٪) را
- ۲۳ تشکیل می‌داد و پس از آن مواد افیونی (۷۸۹ نفر، ۱۸،۴٪)، مسمومیت با چندین ماده (۵۷۴ نفر، ۱۳،۴٪)، الکل‌ها

۱ (۲۲۳ نفر، ۵٫۲٪) و آفتکش‌ها (۲۱۰ نفر، ۴٫۹٪) قرار داشتند. مسمومیت دارویی در بین زنان (۱۳۸۶ نفر، ۶۸٫۶٪) و
 ۲ مسمومیت با مواد افیونی در بین مردان (۶۰۵ نفر، ۷۶٫۷٪) بیشتر بود. شایع‌ترین نوع مسمومیت، عمدی (۷۷٫۲٪) بود.
 ۳ مصرف خوراکی شایع‌ترین راه مسمومیت (۸۸٫۵٪) بود. سابقه پزشکی و دارویی به ترتیب در ۲۲٪ و ۲۸٪ از بیماران
 ۴ گزارش شد. ۴۲٫۲٪ از بیماران سابقه اعتیاد داشتند. ۲۶٫۵٪ از بیماران سابقه بیماری روانی داشتند که ۱۷٫۷٪ از آنها
 ۵ در زمان مراجعه تحت درمان روانپزشکی بودند. ۲۲٫۷٪ از بیماران سابقه اقدام به خودکشی قبلی با میانگین (انحراف
 ۶ معیار) $1,57 \pm 1,65$ داشتند.

۷ Table 1. Basic demographic and toxicological characteristics of patients with acute poisoning.

Variables		
Age (year) Mean (SD)	Total	33.06±14.98
	<20	860 (20.0)
	[20-40]	2299 (53.5)
	[41-65)	941 (21.9)
	>=65	181 (4.2)
	Not available data	16 (0.4)
Gender N(%)	Male	2245 (52.2)
	Female	2052 (47.8)
Marital status N(%)	Married	1972 (45.9)
	Single	2173 (50.6)
	Divorced	82 (1.9)
	Widow	18 (0.4)
	Not available data	52 (1.2)
Level of education N(%)	Illiterate	170 (4.0%)
	Under diploma	1660 (38.6)
	Diploma	1465 (34.1)
	College Education	519 (12.1)
	Not available data	483 (11.2)
Type of poisoning N(%)	Drug	2020 (47.0)
	Opioids	789 (18.4)
	Stimulants	91 (2.1)

	Alcohol	223 (5.2)
	Pesticides	210 (4.9)
	Bite	82 (1.9)
	Heavy metals	19 (0.4)
	Hydrocarbon	3 (0.1)
	Gas poisoning	23 (0.5)
	Household chemical	20 (0.5)
	Multiple substances poisoning	574 (13.4)
	Not available data	5 (0.1)
Type of exposure N(%)	Intentional	3319 (77.2)
	Accidental	857 (19.9)
	Caused by others	60 (1.4)
	Not available data	61 (1.4)
Route of exposure N(%)	Oral	3802 (88.5)
	Inhalation	84 (2.0)
	Injection	20 (0.5)
	Dermal	89 (2.1)
	Multiple exposure	98 (2.3)
	Unknown	153 (3.6)
	Not available data	51 (1.2)
Past medical history N(%)	Yes	945 (22.0)
Past drug history N(%)	Yes	1243 (28.9)
Addiction history N(%)	Yes	1815 (42.2)
Psychiatric disease history N(%)	Yes	1140 (26.5)
Being under psychiatric treatment N(%)	Yes	760 (17.7)
Suicide history N(%)	Yes	975 (22.7)
Suicide family history N(%)	Yes	164 (3.8)
Self-harm history N(%)	Yes	339 (7.9)

Criminal record history N(%)	Yes	187 (4.4)
Number of suicides N(%)	Mean (SD)	1.57±1.65

جدول ۲ معاینه فیزیکی، درمان مورد استفاده و پیامد بیماران شرکت کننده در مطالعه را نشان می دهد. اکثر بیماران با سطح هوشیاری طبیعی (۷۶,۲٪) مراجعه کردند. تهوع و استفراغ شایع ترین علائم بالینی بودند که در ۲۱,۴٪ از بیماران مشاهده شد. میانگین (IQR) مدت بستری در بیمارستان ۱۸,۰۰ (۱-۱۲۲۲) ساعت بود. ۸,۵٪ از بیماران نیاز به بستری در بخش مراقبت های ویژه داشتند. میانگین (انحراف معیار) تعداد روزهای سپری شده در بخش مراقبت های ویژه ۱۷,۵۰ (۱۴,۸۵) بود. ۴,۴٪ از بیماران نیاز به لوله گذاری داشتند. بیش از نیمی از بیماران تحت درمان با زغال فعال قرار گرفتند. شستشوی معده روی ۱۴۸۸ بیمار (۳۴,۶٪) انجام شد. تقریباً از هر سه بیمار، یک نفر پادزهر دریافت کرد. سی و سه بیمار (۰,۸٪) در طول بستری فوت کردند، در حالی که ۳۸۲۱ بیمار (۸۹٪) با موفقیت درمان شدند. موارد باقی مانده (۱۰,۲٪) یا در بخش های دیگر بستری شدند یا با رضایت خود از بیمارستان مرخص شدند. ۳۳ نفر (۰,۸٪) از بیماران فوت کردند.

Table 2. Physical examination, treatment used and outcome of patients with acute poisoning

Variables			۱۱
Pupil N(%)	Normal		2925 (68.1)
	Miosis		843 (19.6)
	Mydriasis		374 (8.7)
Systolic BP (mmHg) Mean (SD)			122.69 (18.22)
Diastolic BP (mmHg) Mean (SD)			77.38 (12.80)
O2 saturation Mean (SD)			93.98 (18.85)
Heart rate Mean (SD)			89.82 (25.38)
Respiratory rate Mean (SD)			17.64 (7.02)
Temperature Mean (SD)			37.47 (13.12)
Nausea/vomiting N(%)		Yes	918 (21.4%)
Diarrhea		Yes	61 (1.4)
Abdominal Pain		Yes	265 (6.2)
Heart Sound		normal	347 (8.1)
Lung Sound		normal	101 (2.4)
Length of hospitalization Hours ; Median(Max-Min)			18.00 (1-1222)
ICU admission N (%)		Yes	363 (8.5%)
ICU admission Days; Median(Max-Min)		Yes	17.50 (7-28)
Intubation N(%)		Yes	189 (4.4%)
Charcoal therapy N(%)		Yes	2464 (57.3%)
Lavage N(%)		Yes	1488 (34.6%)
Antidote N(%)		Yes	1416 (33%)
Outcome N(%)	Mortality	Yes	33 (0.8)
	Recovery	Yes	3821 (89.0%)

- ۱
- ۲ تخمین زده می‌شود که مسمومیت با مواد مختلف سالانه بیش از یک میلیون بیماری ایجاد می‌کند (۲۱). در
- ۳ مطالعه‌ای توسط علی‌نژاد و همکاران، مسمومیت حاد ناشی از مواد، سومین علت مرگ و میر ناشی از خودکشی بود
- ۴ (۴). هر ساله تقریباً ۳۰۰۰ مسمومیت در تهران رخ می‌دهد که منجر به نزدیک به ۱۲۰۰ بستری در بخش‌های
- ۵ سم‌شناسی، ۱۲۰ بستری در بخش‌های مراقبت‌های ویژه سم‌شناسی و حداقل ۱۲۰ مرگ می‌شود (۴). میزان
- ۶ مسمومیت در بین کشورها متفاوت است و می‌تواند به متغیرهایی مانند سبک زندگی، سطح اقتصادی-اجتماعی،
- ۷ دیدگاه‌های فرهنگی و دسترسی آسان به مواد مضر مانند آفت‌کش‌ها و داروها (۲۲) که هم کشورهای توسعه‌یافته و
- ۸ هم در حال توسعه را تحت تأثیر قرار می‌دهد، نسبت داده شود. ایران نیز از این قاعده مستثنی نیست (۴). در سال
- ۹ ۲۰۲۳، بیمارستان خورشید یک سیستم ثبت داده‌های بیمار ایجاد کرد تا جزئیات بیماران مسموم، از جمله اطلاعات
- ۱۰ جمعیت‌شناختی، وضعیت اقتصادی-اجتماعی، نوع مسمومیت و روش درمان را به طور کامل تجزیه و تحلیل کند.
- ۱۱ بیمارستان خورشید به عنوان مرکز ارجاع موارد مسمومیت حاد در بخش مرکزی ایران فعالیت می‌کند. در این مطالعه،
- ۱۲ ما روش‌های ثبت و اطمینان از صحت اطلاعات جمع‌آوری‌شده در این مرکز را شرح می‌دهیم. نگرانی اصلی ما احتمال
- ۱۳ خطا در هر سطحی، از تشخیص بیماری تا ثبت اطلاعات بیماران در سیستم بود. خطاها ممکن است در هر مرحله از
- ۱۴ گرفتن شرح حال، تشخیص بیماری یا ورود اطلاعات به سیستم رخ دهند. اقداماتی برای به حداقل رساندن احتمال
- ۱۵ خطا در تمام سطوح انجام شده است.
- ۱۶ ماهیت بیماران مسموم اغلب منجر به شرح حال‌های نادرست می‌شود. به محض ورود به بخش اورژانس، از بیماران
- ۱۷ خواسته می‌شود که شرح حال پزشکی خود را ارائه دهند و آزمایش‌های لازم تجویز می‌شود. شرایط بیمار بر اساس
- ۱۸ شرح حال بیمار، نتایج آزمایش‌ها و مشاوره با یک متخصص آماده به کار تشخیص داده می‌شود. کارورزان، رزیدنت‌های
- ۱۹ بیمارستان و متخصصان سم‌شناسی روزانه همه بیماران را برای تأیید تشخیص‌هایشان معاینه می‌کنند.
- ۲۰ برای کاهش احتمال خطا در ثبت اطلاعات بیمار، کارشناس ثبت اطلاعات، شرح حال بیمار را وارد کرده و اطلاعات را
- ۲۱ در همان روز در سیستم ثبت می‌کند. این سیستم به گونه‌ای طراحی شده است که از پیشرفت به مرحله بعدی بدون
- ۲۲ ورود کامل اطلاعات جلوگیری کند و در نتیجه احتمال خطا را کاهش دهد. علاوه بر این، یک کارشناس دیگر ۱۰٪ از
- ۲۳ اطلاعات ثبت شده را برای اطمینان از صحت آن، دوباره بررسی می‌کند. از این سیستم برای استخراج و تجزیه و
- ۲۴ تحلیل تمام داده‌های لازم برای این بررسی استفاده شد. مطالعه ما، داروها را به عنوان شایع‌ترین علت مسمومیت حاد
- ۲۵ (۴۷٪) و پس از آن مواد افیونی (۱۸،۴٪) و مسمومیت‌های دارویی متعدد (۱۳،۴٪) شناسایی کرد. این یافته با
- ۲۶ بررسی‌های ملی در ایران که مسمومیت دارویی را به عنوان علت اصلی مسمومیت گزارش کرده‌اند، همسو است (۴). با
- ۲۷ این حال، لازم به ذکر است که مسمومیت با تریاک و مواد افیونی نیز بخش قابل توجهی از موارد را در مرکز ما تشکیل
- ۲۸ می‌دهند که با مطالعات قبلی که شیوع مسمومیت با تریاک در ایران را برجسته می‌کنند، مطابقت دارد (۴). در حالی
- ۲۹ که برخی از کشورهای در حال توسعه، مواد شیمیایی خانگی را به عنوان علت اصلی حوادث مسمومیت گزارش

می‌کنند (۲۳)، اهمیت مسمومیت‌های دارویی و مواد افیونی در مطالعه ما، چالش‌های منحصر به فردی را که در بافت ایران با آن مواجه هستیم، برجسته می‌کند و به طور بالقوه منعکس کننده عواملی مانند دسترسی به داروهای تجویزی، الگوهای سوء مصرف مواد مخدر و در دسترس بودن مواد افیونی است.

میزان مرگ و میر ۰,۸ درصدی در مطالعه ما نسبتاً پایین است که نشان دهنده اثربخشی پروتکل‌های درمانی به کار رفته در مرکز اورژانس مسمومیت بیمارستان خورشید است. از آنجایی که ما شدت مسمومیت را در موارد خود تعیین نکردیم، این علیرغم تعداد بالای افراد بستری شده به دلیل مسمومیت عمدی است که اکثریت قریب به اتفاق موارد در مطالعه ما را تشکیل می‌داد.

در واقع، ۲۲,۷ درصد از بیماران ما سابقه اقدام به خودکشی داشتند. این میزان بالای مسمومیت عمدی، نیاز فوری به بهبود خدمات سلامت روان و برنامه‌های پیشگیری از خودکشی در مرکز ایران را برجسته می‌کند. یک مطالعه مشابه در تهران نیز نشان داد که بخش قابل توجهی از موارد مسمومیت مربوط به اقدام به خودکشی است (۲۴) که بر اهمیت پرداختن به مسائل سلامت روان در زمینه تلاش‌های پیشگیری از مسمومیت تأکید می‌کند. این واقعیت که اکثر این بیماران با موفقیت درمان شدند، اهمیت وجود مراکز مسمومیت مجهز و دارای پرسنل کافی را برجسته می‌کند.

هنگام بررسی الگوهای خاص جنسیتی مسمومیت، داده‌های ما تفاوت‌های قابل توجهی را در عوامل ایجادکننده نشان داد. مسمومیت دارویی در زنان (۶۸,۶٪) در مقایسه با مردان (۳۱,۴٪) به طور قابل توجهی شایع‌تر بود. برعکس، مسمومیت با مواد افیونی در مردان (۷۶,۷٪) به طور قابل توجهی بیشتر از زنان (۲۳,۳٪) بود. با وجود این تفاوت‌ها، داروها همچنان عامل اصلی مسمومیت در هر دو جنس بودند. این تغییرات خاص جنسیتی ممکن است منعکس کننده تفاوت در مصرف دارو، الگوهای سوء مصرف مواد و مسیرهای بالقوه مواجهه بین مردان و زنان باشد. به عنوان مثال، ممکن است برای زنان داروهای خاصی برای شرایطی مانند اضطراب یا افسردگی تجویز شود که خطر مسمومیت مرتبط با دارو را، چه عمدی و چه غیرعمدی، افزایش می‌دهد. مطالعات مشابه (۲۵) نیز تفاوت‌های جنسیتی در علت‌شناسی مسمومیت را گزارش کرده‌اند، اگرچه الگوهای خاص ممکن است بسته به جمعیت و منطقه متفاوت باشند. تحقیقات بیشتری برای بررسی عوامل زمینه‌ای مؤثر در این نابرابری‌ها و تدوین استراتژی‌های پیشگیری هدفمند برای هر جنس مورد نیاز است.

نتیجه‌گیری

این مطالعه مقطعی با استفاده از داده‌های سیستم ثبت داده‌های KHPEC، بینش‌های منحصر به فردی در مورد اپیدمیولوژی مسمومیت حاد در اصفهان، بخش مرکزی ایران، ارائه می‌دهد. طبق این مطالعه، مسمومیت دارویی شایع‌ترین علت مسمومیت حاد است که داروهای تجویزی در رتبه اول و پس از آن مواد افیونی قرار دارند. این یافته‌ها اهمیت اقدامات پیشگیرانه هدفمند، به ویژه آن‌هایی که بر مصرف دارو و مواد افیونی تمرکز دارند، را در کاهش میزان مسمومیت در این منطقه برجسته می‌کند.

جمع‌آوری جامع داده‌ها و رویه‌های تضمین کیفیت مورد استفاده در KHPEC، همانطور که در این مقاله گزارش شده است، پایه و اساس محکمی برای نظارت بر روند مسمومیت و ارزیابی موفقیت استراتژی‌های مداخله فراهم می‌کند. داده‌های جمعیت‌شناختی و بالینی به دست آمده، از جمله سن، جنسیت و سابقه اقدام به خودکشی، به درک دقیق عوامل مرتبط با مسمومیت حاد کمک می‌کند.

اگرچه این مطالعه خلاصه مفیدی از روند مسمومیت در مرکز ایران ارائه می‌دهد، اما برای درک علل اساسی این روندها و ایجاد مداخلات پیشگیرانه متمرکز، مطالعات بیشتری مورد نیاز است.

نظارت و تجزیه و تحلیل مداوم داده‌های KHPEC، همراه با مداخلات مبتنی بر جامعه، می‌تواند به کاهش قابل توجه بروز مسمومیت حاد و بهبود پیامدهای سلامت عمومی در منطقه کمک کند. سیستم ثبت اطلاعات ایجاد شده در بیمارستان خورشید، ابزاری مهم برای نظارت مداوم و تصمیم‌گیری مبتنی بر شواهد در پیشگیری و درمان مسمومیت است.

تشکر و قدردانی:

این پروژه با حمایت مالی دانشگاه علوم پزشکی اصفهان IR.MUI.MED.REC.1400.097 انجام شده است. از همکاران و پرسنل بخش سم‌شناسی بالینی و همچنین کارکنان بایگانی بیمارستان خورشید (مرکز توسعه تحقیقات بالینی) به خاطر کمک‌های فنی ارزشمند و حمایت کلی‌شان تشکر می‌کنیم.

موضوع: ویژگی‌های اپیدمیولوژیک و بالینی مسمومیت با تریاک در مقایسه با سایر مواد مخدر در یک مرکز ارجاع مسمومیت: مطالعه مبتنی بر ثبت



چکیده:

زمینه: یکی از علل شایع مرگ و میر، مسمومیت با مواد مخدر است. مسمومیت با تریاک بدلیل در دسترس بودن از مسمومیت‌های شایع می باشد. لذا مطالعه ای با هدف مقایسه ویژگی‌های بالینی-اپیدمیولوژیک مسمومیت با تریاک با سایر انواع مواد مخدر انجام شد.

روش‌ها: این مطالعه گذشته‌نگر بر روی بیماران مبتلا به مسمومیت با مواد مخدر انجام شد و به گروه مسمومیت با تریاک و یک گروه با سایر انواع مسمومیت با مواد مخدر تقسیم شدند.

نتایج: تعداد کل ۱۱۲۷ بیمار که در طول یک دوره یک ساله دچار مسمومیت با مواد مخدر (با یا بدون مواد دیگر) شده بودند، بررسی شدند که ۱۸۵ نفر از آنها تریاک مصرف کرده بودند. در میان این بیماران، ۷۶۲ نفر منحصراً مواد مخدر مصرف می‌کردند که ۱۲۶ نفر از آنها به طور خاص تریاک مصرف کرده بودند. بیماران مبتلا به مسمومیت با

تریاک مسن‌تر، متاهل، با تحصیلات کم‌تر و شیوع بیماری زمینه‌ای بالاتری داشتند. از نظر سطح هوشیاری، تفاوت معنی‌داری بین دو گروه وجود داشت ($P < 0.001$). گنجی، استوپور و کما در بین افراد مبتلا به مسمومیت با تریاک شایع‌تر بود. از نظر لوله‌گذاری تراشه و پیامد در هر دو گروه، تفاوت آماری معنی‌داری وجود نداشت ($P > 0.05$). رگرسین لجستیک چند متغیره در مسمومیت با تریاک نشان داد که به ازای هر یک سال افزایش سن، احتمال مسمومیت با تریاک تا ۵٪ ($OR = 1.05$, 95%CI (1.03-1.07); $P < 0.001$) در مقایسه با سایر مسمومیت‌های مخدری افزایش می‌یابد. در مجموع ۱۴ بیمار فوت کردند که ۳ نفر از آنها تریاک مصرف کرده بودند.

نتیجه‌گیری: این یافته‌ها می‌تواند برای ارزیابی خطر، مدیریت مسمومیت با تریاک و استراتژی‌های پیشگیری برای گروه‌های پرخطر مفید باشد.

مقدمه:

مواد افیونی دسته‌ای از داروهای مصنوعی یا نیمه مصنوعی هستند که از مواد طبیعی مشتق شده از گیاه خشخاش، یکی از قدیمی‌ترین گیاهان دارویی شناخته شده برای بشریت، استخراج یا تقلید می‌شوند (Dart et al., 2015, KuKanich and Wiese, 2015). مواد افیونی از جمله رایج‌ترین داروهای مسکن تجویز شده هستند که می‌توانند باعث سرخوشی و در نتیجه مصرف تفریحی غیرپزشکی نیز شوند (Crisis, 2020).

تریاک ماده‌ای بسیار اعتیادآور و شیرین رنگ است که با بریدن کپسول‌های نارس گیاه *Papaver somniferum* استخراج می‌شود (Martínez and Ballesteros, 2019). این ماده به اشکال مختلفی از جمله تریاک خام، تفاله، تریاک تصفیه شده و شیر تریاک وجود دارد. تریاک یک مسکن مخدر است که به عنوان آگونیست گیرنده‌های درد در سیستم عصبی عمل می‌کند (Menati et al, 2017). تریاک و مشتقات آن به طور گسترده در مراکز پزشکی برای تسکین درد حاد مورد استفاده قرار می‌گیرند. در حالی که آنها مزایای درمانی قابل توجهی ارائه می‌دهند، سوء مصرف و وابستگی به آنها به یک نگرانی عمده در سلامت عمومی تبدیل شده است (Volkow et al, 2019).

مصرف بیش از حد حاد مواد افیونی یکی از عوارض اصلی سوء مصرف مواد مخدر و یکی از علل اصلی مرگ و میر در بین مصرف کنندگان مواد مخدر است (Karbakhsh and Zandi, 2007). در سال ۲۰۲۰، ۹۱۷۹۹ مورد مسمومیت دارویی منجر به مرگ در ایالات متحده رخ داده است که ۷۵٪ آنها مربوط به مواد افیونی بوده است (Spencer et al, 2022). کشورهای آسیایی همچنان تولیدکنندگان اصلی مواد افیونی غیرقانونی هستند (Noohi et al, 2011) که چالش‌های قابل توجهی را برای کشورهای در حال توسعه مانند ایران ایجاد می‌کند. (Alinejad et al, 2017).

به نظر می‌رسد الگوی سوء مصرف مواد مخدر غیرقانونی در استان‌های ایران متفاوت است (Ayatollahi et al., 2011, Azarakhsh et al., 2021).

تریاک و مشتقات آن یکی از رایج‌ترین مواد مخدر غیرقانونی مصرف شده در این کشور هستند. (Derhami et al., 2021) خود تریاک در رتبه اول و باقیمانده آن که "تفاله" نامیده می‌شود در رتبه دوم قرار دارد (Noohi et al., 2011). مطالعات مقطعی، شیوع ناهمگن سوء مصرف مواد افیونی در طول عمر را در بین استان‌های مختلف، از ۰.۴ تا ۴.۸ گزارش کرده‌اند (Menati et al, 2017). سومین مطالعه در مورد ارزیابی سریع سوء مصرف مواد نشان داد که ۱.۲ میلیون مصرف‌کننده تریاک و سایر مواد افیونی در کشور وجود دارد (Momtazi and Rawson, 2010).

ایران با کشورهای موسوم به «هلال طلایی»، پاکستان و افغانستان، که به عنوان تولیدکنندگان اصلی تریاک غیرقانونی در جهان و تأمین‌کننده اصلی اروپا شناخته می‌شوند، هم‌مرز است. (Martínez and Ballesteros, 2019) ریشه تاریخی مصرف تریاک و مشتقات آن در ایران منجر به افزایش شیوع سوءمصرف تریاک در مقایسه با سایر مواد مخدر غیرقانونی مانند محرک‌ها شده است. (Nazarzadeh et al., 2015, Menati et al., 2017)

مطالعات انجام شده در اصفهان، تهران و مشهد، پرجمعیت‌ترین استانهای ایران، مسمومیت با مواد افیونی را به عنوان یکی از شایع‌ترین علل مسمومیت حاد منجر به بستری شدن در بیمارستان گزارش کرده‌اند. (Hadeiy et al., 2022, Eizadi-Mood et al., 2024). مسمومیت با تریاک می‌تواند با طیف متنوعی از تظاهرات بالینی، اغلب بسته به دوز مصرف شده و حساسیت فردی، بروز کند. علائم رایج شامل دپرسیون تنفسی، میوز و تغییر وضعیت روانی است. (Haddad and Winchester, 2007).

برای نجات جان تعداد بیشتری از بیماران، ارائه برنامه‌هایی برای آموزش جامعه و اعضای خانواده باید در نظر گرفته شود (Wermeling, 2015). برای رسیدگی به این موضوع و با توجه به شیوع بالای سوءمصرف تریاک در کشور ما، انجام یک تحلیل جامع اپیدمیولوژیک و بالینی از وضعیت فعلی برای بهبود نتایج درمان و اجرای اقدامات پیشگیرانه مناسب ضروری است (Mattson, 2018). علیرغم اهمیت این مسئله اجتماعی و بهداشتی، توجه کمی به تریاک به طور خاص و در مقایسه با سایر انواع مواد افیونی در مقالات علمی شده است.

بنابراین، ما مطالعه‌ای را برای ارزیابی جنبه‌های اپیدمیولوژیک و بالینی مسمومیت با تریاک در مقایسه با سایر انواع مواد افیونی در بیماران بستری در یک مرکز مسمومیت ارجاعی در یک دوره یک ساله انجام دادیم.

روش پژوهش:

(۱) طراحی و تنظیم مطالعه

این یک مطالعه گذشته‌نگر بر روی داده‌های سیستم ثبت بیماران متوالی مراجعه‌کننده به مرکز اورژانس مسمومیت بیمارستان خورشید (KHPEC) از ۵ مه ۲۰۲۳ تا ۵ مه ۲۰۲۴ است. این بیمارستان یک بیمارستان آموزشی عالی در اصفهان، ایران است که به ساکنان محلی و مراجعین خارج از استان خدمات ارائه می‌دهد و بنابراین یکی از بزرگ‌ترین بیمارستان‌های دارای مرکز سم‌شناسی در مرکز ایران است. داده‌ها از سیستم ثبت داده‌ها (کد اخلاقی IR.MUI.MED.REC.1400.097) استخراج شدند. این مطالعه توسط کمیته اخلاق هیئت بررسی دانشگاه علوم پزشکی اصفهان با کد IR.MUI.REC.1403.018 و مطابق با اصول اعلامیه هلسینکی تأیید شد.

(۲) شرکت‌کنندگان

در طول دوره مطالعه، تمام بیماران مبتلا به مسمومیت با مواد افیونی (با یا بدون سایر مسمومیت‌ها) که در اورژانس، بخش یا بخش مراقبت‌های ویژه بیمارستان KHPEC بستری شده بودند، در مطالعه ما گنجانده شدند. بیمارانی که پس از مسمومیت به بخش‌های دیگر منتقل شده یا با رضایت شخصی بیمارستان را ترک کردند، برای اطمینان از پیگیری صحیح بیماران، از مطالعه حذف شدند. بیماران مبتلا به مسمومیت با مواد افیونی با و بدون سایر مواد (از جمله داروها، الکل و محرک‌ها) به دو گروه تقسیم شدند: (۱) بیماران مبتلا به مسمومیت با تریاک شامل تریاک،

عصاره‌های تصفیه شده تریاک (شیره)، تفاله و شربت تریاک (۲) بیماران مبتلا به سایر انواع مسمومیت با مواد افیونی به جز تریاک شامل متادون، ترامادول، بوپرنورفین، هروئین، پتیدین، کدئین، اکسی‌کدون، مورفین، دکسترومتورفان. سپس بیمارانی که منحصراً با مواد افیونی مسموم شده بودند به دو گروه تقسیم شدند: (۱) بیماران مبتلا به مسمومیت با تریاک شامل تریاک، شیره تریاک تصفیه شده، تفاله و شربت تریاک (۲) بیماران مبتلا به مسمومیت با سایر انواع مواد افیونی به جز تریاک شامل متادون، ترامادول، بوپرنورفین، هروئین، پتیدین، کدئین، اکسی‌کدون، مورفین، دکسترومتورفان.

۳) جمع آوری داده ها

داده‌های زیر با استفاده از سیستم ثبت داده‌های KHPEC جمع‌آوری شدند: اطلاعات جمعیت‌شناختی (سن، جنس، ملیت)، نوع ماده افیونی، نحوه مواجهه (خوراکی، پوستی، استنشاقی، تزریقی، مواجهه چندگانه و ناشناخته)، نحوه مسمومیت (تصادفی، عمدی، القایی، مصرف بیش از حد)، موارد قبلی خودکشی، تعداد خودکشی‌های قبلی، سابقه خودآزاری، سابقه سوء پیشینه، تظاهرات بالینی در بدو پذیرش، میانگین مدت بستری در بیمارستان، احیای قلبی ریوی، لوله گذاری تراشه و پیامد (مرگ و میر در بیمارستان یا بهبودی).

۴. تجزیه و تحلیل آماری

داده‌ها با استفاده از نسخه ۱۶ نرم‌افزار (SPSS Inc., Statistical Package for Social Sciences) (Chicago, IL, USA) تجزیه و تحلیل شدند. متغیرهای کمی به صورت میانگین $\pm$ انحراف معیار [SD] و متغیرهای دسته‌ای به صورت فراوانی (درصد) ارائه شدند. نرمال بودن متغیرهای پیوسته با استفاده از آزمون کولموگروف-اسمیرنوف و نمودار Q-Q ارزیابی شد. برای مقایسه متغیرهای دسته‌بندی شده بین تریاک و سایر مواد افیونی از آزمون کای دو مستقل/آزمون دقیق فیشر استفاده شد. برای مقایسه متغیرهای پیوسته با توزیع نرمال و غیرنرمال بین تریاک و سایر مواد افیونی، به ترتیب از آزمون تی مستقل و آزمون ناپارامتری من-وایت استفاده شد.

یافته‌ها:

در این مطالعه، تعداد کل ۱۱۲۷ بیمار که در طول یک دوره یک ساله دچار مسمومیت با مواد افیونی (با یا بدون مواد دیگر) شده بودند، بررسی شدند که ۱۸۵ نفر از آنها تریاک مصرف کرده بودند. در میان این بیماران، ۷۶۲ نفر منحصراً مواد افیونی مصرف می‌کردند که ۱۲۶ نفر از آنها به طور خاص تریاک مصرف کرده بودند (۱۰۷ بیمار با مسمومیت منحصر به فرد با تریاک و ۱۹ بیمار با مسمومیت با تریاک و سایر انواع مواد افیونی). میانگین $\pm$ انحراف معیار سن همه بیماران 39.84 ± 17.01 سال (محدوده: ۲ تا ۹۰ سال) بود. از بین بیماران، ۸۶۷ نفر (۷۶٫۹٪) مرد بودند (نسبت مرد به زن = ۳٫۳۳). اکثر موارد در محدوده سنی ۳۰ تا ۴۰ سال (۲۴٫۲٪) بودند. جدول ۱ ویژگی‌های جمعیت‌شناختی و سم‌شناسی همه بیماران مورد مطالعه را نشان می‌دهد. از نظر توزیع سنی تفاوت معنی‌داری بین دو گروه وجود داشت. با این حال، اکثر موارد مسمومیت با تریاک و سایر مواد افیونی در افراد بالای ۶۰ سال بود. از نظر

۱ جنسیت، تفاوت معنی‌داری بین دو گروه وجود نداشت؛ ۷۷,۸٪ از بیماران مبتلا به مسمومیت با تریاک و ۷۶,۸٪ از
۲ بیماران مبتلا به مسمومیت با سایر مواد افیونی مرد بودند. اکثر بیماران مبتلا به مسمومیت با تریاک متأهل بودند، در
۳ حالی که بیماران مبتلا به سایر انواع مسمومیت با مواد افیونی عمدتاً مجرد بودند ($P<0.001$). سابقه پزشکی قبلی
۴ در ۲۸٪ از بیماران گزارش شد که تقریباً دو برابر بیشتر در بین بیمارانی بود که تریاک مصرف کرده بودند در مقایسه
۵ با بیمارانی که از سایر مواد افیونی استفاده کرده بودند (به ترتیب ۴۱,۶٪ در مقابل ۲۵,۴٪) ($P<0.001$) همچنین
۶ تفاوت‌های معنی‌داری بین مسمومیت با تریاک و سایر انواع مسمومیت با مواد افیونی از نظر سطح تحصیلات، نحوه
۷ مواجهه، سابقه خودکشی، سابقه کیفری، سابقه خودآزاری و سابقه مصرف مواد مخدر مشاهده شد ($P<0.05$). جدول
۸ ۲، اطلاعات جمعیت‌شناختی، سم‌شناسی و سابقه پزشکی بیماران مبتلا به مسمومیت منحصراً با مواد افیونی را نشان
۹ می‌دهد. از نظر سن، سطح تحصیلات، وضعیت تأهل، نحوه مواجهه، سابقه کیفری، سابقه پزشکی و دارویی قبلی،
۱۰ تفاوت معنی‌داری بین دو گروه وجود داشت. بیماران مبتلا به انواع مختلف مسمومیت با تریاک به طور قابل توجهی
۱۱ مسن‌تر، متأهل و دارای سابقه مواجهه خوراکی و همچنین سوابق پزشکی و دارویی بودند ($P<0.05$).

۱۲ تظاهرات بالینی و پیامدهای همه بیماران در جدول ۳ ارائه شده است. از نظر علائم بالینی در بیماران مبتلا به
۱۳ مسمومیت با تریاک، میوز و تغییر وضعیت ذهنی شایع‌ترین علامت بالینی در ۲۴,۱٪ و ۴۸٪ از بیماران بود. اکثر
۱۴ بیماران در بدو پذیرش هوشیار بودند (۷۵,۹٪)؛ با این حال، از نظر سطح هوشیاری بین دو گروه تفاوت معنی‌داری
۱۵ وجود داشت ($P<0.001$). گیجی، استوپور و کما در بین افراد مبتلا به مسمومیت با تریاک شایع‌تر بود. اندازه
۱۶ غیرطبیعی مردمک چشم در بیماران مبتلا به مسمومیت با تریاک بیشتر مشاهده شد ($P<0.05$). با این حال،
۱۷ تظاهرات غیرطبیعی سیستم تنفسی در بیماران مبتلا به مسمومیت با سایر مواد افیونی بیشتر مشاهده شد ($P<$
۱۸ 0.05). از نظر احیای قلبی ریوی، لوله‌گذاری و پیامد در هر دو گروه تفاوت آماری معنی‌داری وجود نداشت ($P>$
۱۹ 0.05). با این حال، احیای قلبی ریوی، لوله‌گذاری و مرگ و میر در بین بیماران مبتلا به مسمومیت با تریاک بیشتر
۲۰ بود. تظاهرات بالینی و پیامدهای بیماران مبتلا به مسمومیت انحصاری با تریاک در جدول ۴ ارائه شده است. از نظر
۲۱ سطح هوشیاری، فشار خون دیاستولیک و سیستولیک و معاینه تنفسی، تفاوت معنی‌داری بین دو گروه وجود داشت
۲۲ ($P<0.05$). همه انواع تغییر وضعیت ذهنی در بین افراد مبتلا به مسمومیت با تریاک شایع‌تر بود. هیچ تفاوت آماری
۲۳ معنی‌داری در رابطه با احیای قلبی ریوی (CPR)، لوله‌گذاری داخل تراشه و پیامد در هر دو گروه وجود نداشت
۲۴ ($P>0.05$). رگرسیون لجستیک چند متغیره در کل بیماران نشان داد که به ازای هر یک سال افزایش سن، احتمال
۲۵ مسمومیت با تریاک تا ۳٪ افزایش می‌یابد (جدول ۵). روش مسمومیت القایی (OR: 1.09-2.88, 95% CI
۲۶ $P=0.017$); 7.63 یک عامل پیش‌بینی‌کننده برای مسمومیت با تریاک بود. با این حال، مجرد بودن (OR:
۲۷ $P<0.001$), 0.27, 95% CI (0.11-0.68), 0.12, 95% CI (0.07-0.20), (OR:
۲۸ $P<0.001$) به عنوان عوامل محافظتی برای مسمومیت با تریاک شناسایی شدند (جدول ۵).

۱ رگرسيون لجستیک چند متغیره در مسمومیت انحصاری با تریاک نشان داد که به ازای هر یک سال افزایش سن،
 ۲ احتمال مسمومیت با تریاک تا ۵٪ (OR=1.05, 95%CI (1.03-1.07); P<0.001) در مقایسه با مسمومیت با
 ۳ سایر مواد افیونی افزایش می‌یابد.

۴
 ۵ **Table 1: Demographics, toxicological findings, and past medical history of patients with opioid poisoning (with**
 ۶ **and without other substances) based on the type of opioid substance.**

		Total N=1127	Opium (with and without other substances) N=185	Other opioids (with and without other substances) N=942	P- value
Age (year)	<=20	118(10.5%)	4(2.2%)	114(12.1%)	<0.001
	20-30	250(22.3%)	23(12.6%)	227(24.2%)	
	30-40	271(24.2%)	31(17.0%)	240(25.6%)	
	40-50	192(17.1%)	29(15.9%)	163(17.4%)	
	50-60	126(11.2%)	33(18.1%)	93(9.9%)	
	>60	164(100.0%)	62(37.8%)	102(62.2%)	
Gender	Female	260(23.1%)	41(22.2%)	219(23.2%)	0.75
	Male	867(76.9%)	144(77.8%)	723(76.8%)	
Education level	Illiterate	66(6.6%)	22(13.3%)	44(5.3%)	0.001
	Under diploma	503(50.1%)	73(44.2%)	430(51.3%)	
	Diploma	332(33.1%)	57(34.5%)	275(32.8%)	
	College education	102(10.2%)	13(7.9%)	89(10.6%)	
Job	Unemployed+ Housewife	303(27.9%)	53(29.8%)	250(27.5%)	0.18
	Self-employed	546(50.2%)	88(49.4%)	458(50.4%)	
	Employed	29(2.7%)	5(2.8%)	24(2.6%)	
	Student	65(6.0%)	4(2.2%)	61(6.7%)	
	Others	144(13.2%)	28(15.7%)	116(12.8%)	
Marital status	Single	499(44.9%)	44(24.2%)	455(49.0%)	<0.001

	Married	570(51.3%)	133(73.1%)	437(47.0%)	
	Divorced	32(2.9%)	3(1.6%)	29(3.1%)	
	Widow	10(0.9%)	2(1.1%)	8(0.9%)	
Route of exposure	Oral	989 (88.0%)	123 (66.8%)	866 (92.1%)	<0.001
	Inhalation	23 (2.0%)	13 (7.1%)	10 (1.1%)	
	Injection	6 (0.5%)	1 (0.5%)	5 (0.5%)	
	Dermal	1 (0.1%)	0 (0.0%)	1 (0.1%)	
	Multiple exposure	64 (5.7%)	26 (14.1%)	38 (4.0%)	
	Other	1 (0.1%)	0 (0.0%)	1 (0.1%)	
	Unknown	40 ()	21 (11.4%)	19 (2.0%)	
Intentionality	Intentional	370 (33.0%)	65 (35.3%)	305 (32.5%)	0.075
	Induced	27 (2.4%)	9 (4.9%)	18 (1.9%)	
	Accidental	720 (64.2%)	109 (59.2%)	611 (65.1%)	
Addiction history	Yes	786(69.7%)	133(71.9%)	653(69.3%)	0.49
	No	341(30.3%)	52(28.1%)	289(30.7%)	
History of psychiatric disease	Yes	260(23.1%)	37(20.0%)	223(23.7%)	0.28
	No	867(76.9%)	148(80.0%)	719(76.3%)	
Under psychiatric treatment	Yes	148(13.1%)	20(10.8%)	128(13.6%)	0.31
	No	979(86.9%)	165(89.2%)	814(86.4%)	
Suicide history	Yes	217(19.3%)	23(12.4%)	194(20.6%)	0.010
	No	910(80.7%)	162(87.6%)	748(79.4%)	
Number of past suicide		1.64 (1.47)	1.51 (1.63)	2.00 (2.00)	0.50
Suicide family history	Yes	34(3.0%)	5(2.7%)	29(3.1%)	0.79
	No	1093(97.0%)	180(97.3%)	913(96.9%)	
Criminal record history	Yes	101(9.0%)	9(4.9%)	92(9.8%)	0.033
	No	1026(91.0%)	176(95.1%)	850(90.2%)	

Self-harm history	Yes	96(8.5%)	7(3.8%)	89(9.4%)	0.012
	No	1031(91.5%)	178(96.2%)	853(90.6%)	
Past medical history	Yes	316(28.0%)	77(41.6%)	239(25.4%)	<0.001
	No	811(72.0%)	108(58.4%)	703(74.6%)	
Past drug history	Yes	340(30.2%)	67(36.2%)	273(29.0%)	0.050
	No	787(69.8%)	118(63.8%)	669(71.0%)	

Opium including refined opium extracts (shireh), dross and opium syrup; other opioids including all other types of opioid poisoning except opium including methadone, tramadol, buprenorphine, heroin, pethidine, codeine, oxycodone, morphine, dextromethorphan ; Results are presented as number (percent) or mean $\pm$ SD; Categorical variables were compared between groups with Fisher's exact or Chi-square tests or Mann-Whitney U test for non-normal continuous data, where appropriate. P value less than 0.05 was considered statistically significant.

Table 2: Demographics, toxicological findings, and past medical history of patients with exclusive opioid poisoning based on the type of opioid substances.

		Total N=762	Opium N=126	Other opioids N=636	P-value
Age (year)			54.88 (17.78)	39.75 (17.11)	<0.001
Gender	Female	175 (23.0%)	27 (21.4%)	148 (23.3%)	0.65
	Male	587 (77.0%)	99 (78.6%)	488 (76.7%)	
Education level	Illiterate	54 (8.0%)	18 (16.4%)	36 (6.4%)	<0.001
	Under diploma	349 (51.6%)	51 (46.4%)	298 (52.7%)	
	Diploma	219 (32.4%)	36 (32.7%)	183 (32.3%)	
	College education	54 (8.0%)	5 (4.5%)	49 (8.7%)	
Marital status	Single	297 (39.0%)	25 (19.8%)	272 (42.8%)	<0.001
	Married	432 (56.7%)	96 (76.2%)	336 (52.8%)	
	Divorced	16 (2.1%)	0 (0.0%)	16 (2.5%)	
	Widow	8 (1.0%)	2 (1.6%)	6 (0.9%)	
Route of exposure	Oral	684 (90.1%)	86 (68.8%)	598 (94.3%)	<0.001
	Inhalation	20 (2.6%)	11 (8.8%)	9 (1.4%)	

	Injection	5 (0.7%)	0 (0.0%)	5 (0.8%)	
	Dermal	1 (0.1%)	0 (0.0%)	1 (0.2%)	
	Multiple exposure	19 (2.5%)	11 (8.8%)	8 (1.3%)	
	Other	30 (4.0%)	17 (13.6%)	13 (2.1%)	
Intentionality	Intentional	455 (60.1%)	49 (39.2%)	235 (37.2%)	0.12
	Induced	18 (2.4%)	6 (4.8%)	12 (1.9%)	
	Accidental	284 (37.5%)	49 (39.2%)	235 (37.2%)	
Addiction history	Yes	518 (68.0%)	30.2%	430 (67.6%)	0.62
	No	244 (32.0%)	38 (30.2%)	206 (32.4%)	
History of psychiatric disease	Yes	149 (19.6%)	21 (16.7%)	128 (20.1%)	0.37
	No	613 (80.4%)	105 (83.3%)	508 (79.9%)	
Under psychiatric treatment	Yes	82 (10.8%)	10 (7.9%)	72 (11.3%)	0.26
	No	680 (89.2%)	116 (92.1%)	564 (88.7%)	
Suicide history	Yes	101 (13.3%)	10 (7.9%)	91 (14.3%)	0.054
	No	661 (86.7%)	116 (9.1%)	545 (85.7%)	
Number of past suicide			1.15 (0.90)	1.42 (1.26)	0.45
Suicide family history	Yes	16 (2.1%)	2 (1.6%)	14 (2.2%)	0.66
	No	746 (97.9%)	124 (98.4%)	622 (97.8%)	
Criminal record history	Yes	62 (8.1%)	3 (2.4%)	59 (9.3%)	0.010
	No	700 (91.9%)	123 (97.6%)	577 (90.7%)	
Self-harm history	Yes	46 (6.0%)	4 (3.2%)	42 (6.6%)	0.14
	No	716 (94.0%)	122 (96.8%)	594 (93.4%)	
Past medical history	Yes	226 (29.7%)	53 (42.1%)	173 (27.2%)	0.001
	No	536 (70.3%)	73 (57.9%)	463 (72.8%)	
Past drug history	Yes	227 (29.8%)	48 (38.1%)	179 (28.1%)	0.026
	No	535 (70.2%)	78 (61.9%)	457 (71.9%)	

Opium including opium, refined opium extracts (shireh), dross and opium syrup; other opioids including all other types of opioid poisoning except opium including methadone, tramadol, buprenorphine, heroin, pethidine, codeine, oxycodone, morphine, dextromethorphan ; Results are presented as number (percent) or mean $\pm$ SD; Categorical variables were compared between

groups with Fisher's exact or Chi-square tests or Mann–Whitney U test for non-normal continuous data, where appropriate. P value less than 0.05 was considered statistically significant

مقاله شماره : ۳

Determinants of Acute Intentional Poisoning Among Adolescents in Iran: A Registry-Based Study in a Referral Toxicology Center

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Running title: Acute Intentional Poisoning among Adolescents

Abstract

Background:

Acute poisoning among adolescents remains a significant public health concern. While global trends underscore the rising incidence of self-poisoning in this age group, limited data exist from Isfahan, Iran. This study aimed to examine the epidemiological characteristics and determinants of acute intentional poisoning among adolescents aged 11–19 years in a main referral toxicology center in Iran.

Methods:

A retrospective observational study was conducted using registry data from Khorshid Hospital's Poisoning Emergency Center between May 2023 and May 2024. Adolescents aged 11-19

presenting with acute poisoning were categorized based on exposure type (intentional vs. accidental). Logistic regression was used to identify factors independently associated with intentional poisoning.

Results:

Of 692 eligible adolescents, 603 (87.1%) experienced intentional poisoning. Pharmaceutical drugs were the most common toxic agents in intentional cases, predominantly ingested orally. Female gender (OR=3.40; 95% CI: 2.12–5.46), history of psychiatric illness (OR=2.18; 95% CI: 1.01–4.67), and previous suicide attempts (OR=6.29; 95% CI: 1.89–20.96) were significantly associated with intentional poisoning in multivariable analysis. Gastric lavage was more frequently performed in intentional poisonings (47.1% vs. 15.1%, $p < 0.001$), as was administration of activated charcoal (72.9% vs. 29.1%, $p < 0.001$). Antidote use was also more common in intentional cases (30.7% vs. 19.1%, $p = 0.025$). No significant differences were observed in terms of ICU admission, intubation, duration of hospitalization and outcome between patients with intentional and accidental poisoning.

Conclusion:

Intentional poisoning accounts for the majority of acute poisoning cases among our adolescents and is associated with female sex, psychiatric comorbidity and prior suicidal attempts. These findings highlight the urgent need for preventive strategies for this at-risk adolescent's population.

Keywords: Adolescents, Intentional, Acute poisoning

Introduction

Acute poisoning among children and adolescents remains critical but preventable public health concern worldwide^(1, 2) with an estimated 45,000 deaths annually among individuals under the age of 20⁽³⁾.

It constitutes a common reason for emergency department visits with the potential for serious complications^(4, 5). While accidental poisonings are more common in younger children, deliberate ingestion of toxic substances is typically seen in older children and adolescents^(1, 6). Suicide attempts due to poisoning are most often committed by children aged 14–18 years old⁽⁷⁾. The World Health Organization (WHO) reports that suicide ranks as the leading cause of death among 10–19 year olds in low- and middle-income countries and the second leading cause in high-income nations⁽⁸⁾. Among adolescents, intentional self-poisoning has emerged as the most frequent method of suicide attempts⁽⁹⁾. In this age group, poisonings are mainly intentional^(1, 10), frequently involving therapeutic medication such as analgesics, psychotropics, antidepressants, and sedative agents^(9, 11). A single episode of intentional poisoning during adolescence is not only life-threatening in the short term but is also a strong predictor of future suicidal behavior and premature death⁽⁹⁾.

The nature and prevalence of poisoning incidents vary considerably across regions due to differences in socioeconomic conditions, healthcare infrastructure, cultural norms, and the availability of toxic substances⁽¹⁰⁾. In high-income countries, misuse of available medications is more common, whereas in developing regions exposures to agricultural chemicals and insecticides

are also considerable⁽¹²⁻¹⁴⁾. These regional differences highlights the importance of local epidemiological studies to guide context-specific prevention strategies and healthcare responses.

In Iran, although poisoning is recognized as one of major health challenge among children, there is limited data focusing specifically on intentional poisonings among adolescents. Existing literature highlights that intentional poisoning in pediatrics are influenced by gender, a history of deliberate self-harm, known psychiatric history, poor school performance, not living with both parents (for males), recurring drunkenness (for females) and daily smoking ^(4, 15, 16). However, studies exploring these determinants in Iranian adolescents are scarce.

Given this background, the present study was conducted to investigate the determinants of acute intentional poisoning among adolescents aged 11–19 years in a major referral poisoning center in Isfahan, Iran. Additionally, the study seeks to understand the main substance responsible for intentional poisoning in adolescents. If more accurate information is available, it would improve the ability of physicians to increase effective prevention strategies and be aware of high-risk medications for adolescents at risk of self-poisoning.

Method

Study Design and Setting

We conducted a retrospective observational study using the registry database of Khorshid Hospital's Poisoning Emergency Center (KHPEC), Isfahan, Iran affiliated to Isfahan University of Medical Science. The registration system commenced operations in 2023 and has been consistently collecting data on patients admitted to KHPEC with acute poisoning (IR.MUI.MED.REC.1400.097). This study was conducted in accordance with the principles of declaration of Helsinki. This study was approved by the ethics committee of Review Board of Isfahan University of medical science (IR.ARI.MUI.REC.1404.046).

All patients under 20 years old, classified as pediatric cases, who hospitalized at KHPEC with acute poisoning between May 5, 2023, and May 5, 2024 and was recorded in the registration system were included in this study. Our center primarily serves as a referral center for acute adult poisoning cases. Children, particularly those aged 10 and under, are typically admitted to a pediatric unit at another hospital to receive appropriate care. Therefore, patients under the age of 10 were excluded from our study. Moreover those who had incomplete data about intent behind poisoning or those whose poisoning caused by others were excluded from our study.

Diagnoses of type of acute poisoning were made by the attending physician treating the patient based on all available information including self-reported histories from the pediatric patients or their parents, physical examinations, and laboratory findings when necessary.

Data collection

Data were initially collected in a collection form developed specifically for the study by clinical staff and then registered in a structured database by research staff after being trained.

For each case following data were collected using KHPEC data registration system: demographic information (age, gender, marital status, level of education, type of exposure (accidental, intentional, caused by others), kind of poisoning (pharmaceutical drug, opioid, stimulant, alcohol,

bite, pesticide, heavy metals, multiple substance poisoning ((including at least one of which was listed in the first seven categories)), inhalational poisoning and other poisoning ((including unknown poisoning, and poisonous plants))), past medical history, previous psychiatric disease, suicide history, self-harm history, addiction history and type of addiction (including alcohol, opioids, stimulants, smoking, polysubstance addiction and other types of addiction such as medications and unknown addiction), criminal record history, clinical manifestations on admission, duration of hospitalization, intubation and outcome (personal consent, recovery and mortality). Clinical information including vital signs at the time of admission, and general physical examination, treatments measures (activated charcoal, gastric lavage and antidote) were also recorded.

Statistical analysis

Data were analyzed using version 21 of the Statistical Package for Social Sciences (SPSS Inc., Chicago, IL, USA). Continuous data were expressed as mean (SD) and median with interquartile range (IQR), whereas categorical data were presented as numbers (n) and/ or percentages (%). Normality of continuous variables was assessed by using Kolmogorov-Smirnov test and Q-Q plot. Chi-square independent/ Fisher's exact test were used to assess associations between categorical variables and studied group. ANOVA test were used for comparing normally and non-normally distributed continuous variables, respectively. The association of demographics and toxicological factors were estimated using logistic regression analysis and reported as odds ratio (OR) with 95% confidence interval (CI). The P value less than 0.05 was considered statistically significant.

Results

A total of 860 patients under the age of 20 were recorded in the registration system. However, 154 patients were excluded for following reasons: discharge with personal consent (n=107), age under 10 (n=41), unclear intent (n=14) or poisoning caused by others with ambiguous intent (n=13). Consequently, 692 patients aged 11–19 years were included in the final analysis. Among the patients included, 603 patients (87.1%) experienced intentional poisoning, while 89 patients (12.9%) experienced accidental poisoning. Mean (SD) age of study population was 16.48±1.97 (minimum:11 , maximum:19). The majority of cases were female (63.2%). Oral ingestion was the most common route of exposure (93.8%).

Table 1 presents demographic, toxicological characteristics and past history of patients based on type of exposure. Most patients were single (95%) and had not completed a high school diploma. While there were no statistically significant differences in education level or marital status between groups, significant differences were observed in the type and route of poisoning. Pharmaceutical medications ingestion was the most common cause of poisoning overall (60.5%) and was significantly more prevalent in the intentional group (67.3% vs. 14.6%, $p < 0.001$). In contrast, alcohol and animal bites were the leading causes of accidental poisoning (30.3% and 16.9%, respectively).

Patients with intentional poisoning had significantly higher proportion of psychiatric history (26.7% vs. 10.1%, $p = 0.001$), previous suicide attempts (25.5% vs. 3.4%, $p < 0.001$), and self-harm (12.4% vs. 4.5%, $p = 0.028$). Although history of addiction were similar between intentional and accidental cases ($P > 0.05$), type of addiction showed significant differences ($P < 0.05$). Stimulant addiction, polysubstance addiction and smoking had a higher proportion in children with

intentional poisoning. Criminal records were rare and showed no significant association with type of poisoning.

Table 3. Demographic, toxicological characteristics and past history of patients based on type of exposure

Variables	Variable Categories	Total	Intentional N=603	Accidental N= 89	P-value
Age	Mean (SD)	16.48±1.97	16.48 (1.9)	16.51 (2.11)	0.90
Gender	Female	437 (63.2%)	404 (67.0%)	33 (37.1%)	<0.001
	Male	255 (36.8%)	199 (33.0%)	56 (62.9%)	
Marital Status	Single	651 (95.0%)	564 (94.5%)	87 (98.9%)	0.07
	Married	34 (5.0%)	33 (5.5%)	1 (1.1%)	
Education Level	Illiterate	17 (2.7%)	14 (2.5%)	3 (3.8%)	0.37
	Under diploma	436 (68.4%)	389 (69.6%)	47 (60.3%)	
	Diploma	163 (25.6%)	139 (24.9%)	24 (30.8%)	
	College education	21 (3.3%)	17 (3.0%)	4 (5.1%)	
Type of Poisoning	Drug	419 (60.5%)	406 (67.3%)	13 (14.6%)	<0.001
	Opioids	54 (7.8%)	45 (7.5%)	9 (10.1%)	
	Stimulants	13 (1.9%)	7 (1.2%)	6 (6.7%)	
	Alcohol	47 (6.8%)	20 (3.3%)	27 (30.3%)	
	Bite	15 (2.2%)	0 (0.0%)	15 (16.9%)	
	Heavy metals	5 (0.7%)	4 (0.7%)	1 (1.1%)	
	Pesticides	33 (4.8%)	33 (5.5%)	0 (0.0%)	
	Hydrocarbon	1 (0.1%)	1 (0.2%)	0 (0.0%)	
	Others	19 (2.7%)	13 (2.2%)	6 (6.7%)	
	Multiple	84 (12.1%)	74 (12.3%)	10 (11.2%)	
	Gas poisoning	2 (0.3%)	0 (0.0%)	2 (2.2%)	
Route of Exposure	Oral	649 (93.8%)	587 (97.3%)	62 (69.7%)	<0.001
	Inhalation	8 (1.2%)	3 (0.5%)	5 (5.6%)	
	Injection	1 (0.1%)	0 (0.0%)	1 (1.1%)	
	Bite	15 (2.2%)	0 (0.0%)	15 (16.9%)	
	Multiple exposure	7 (1.0%)	4 (0.7%)	3 (3.4%)	
	Unknown	12 (1.7%)	9 (1.5%)	3 (3.4%)	
Past medical history	Yes	95 (13.7%)	86 (14.3%)	9 (10.1%)	0.29
	No	597 (86.3%)	517 (85.7%)	80 (89.9%)	
Psychiatric History	Yes	170 (24.6%)	161 (26.7%)	9 (10.1%)	0.001
	No	522 (75.4%)	442 (73.3%)	80 (89.9%)	
Suicide History	Yes	157 (22.7%)	154 (25.5%)	3 (3.4%)	<0.001
	No	535 (77.3%)	449 (74.5%)	86 (96.6%)	
Number of suicide attempts	Mean (SD)		1.56 ± 1.69	1.22 ± 2.17	0.57
Suicide family history	Yes	33 (4.8%)	31 (5.1%)	2 (2.2%)	0.18
	No	659 (95.2%)	572 (94.9%)	87 (97.8%)	
Self-harm history	Yes	79 (11.4%)	75 (12.4%)	4 (4.5%)	0.028
	No	613 (88.6%)	528 (87.6%)	85 (95.5%)	
Addiction History	Yes	173 (25.0%)	152 (25.2%)	21 (23.6%)	0.74
	No	519 (75.0%)	451 (74.8%)	68 (76.4%)	
Type of addiction	Stimulants	11 (6.4%)	10 (6.6%)	1 (4.8%)	0.031
	Opioids	3 (1.7%)	2 (1.3%)	1 (4.8%)	
	Smoking	71 (41.0%)	65 (42.8%)	6 (28.6%)	
	Others+Drugs+Unknown	9 (5.2%)	8 (5.3%)	1 (4.8%)	

Criminal record	Alcohol	12 (6.9%)	7 (4.6%)	5 (23.8%)	0.50
	Polysubstance	67 (38.7%)	60 (39.5%)	7 (33.3%)	
	Yes	5 (0.7%)	0 (0.0%)	5 (0.8%)	
	No	687 (99.3%)	89 (100.0%)	598 (99.2%)	

As shown in Table 2, most patients were alert upon presentation (86.5%), though a higher proportion of intentional cases had normal consciousness levels compared to accidental cases (87.9% vs. 77.3%) and lower proportion of intentional cases had an altered mental status. Diastolic blood pressure was slightly but significantly higher in the intentional group (76.1 vs. 73.9 mmHg, $p = 0.04$), while other vital signs including systolic blood pressure, heart rate, respiratory rate, and temperature did not differ significantly between groups.

Nausea and vomiting were reported in nearly one-third of patients, with no significant difference between groups (29.3%). In most cases, treatment was non-specific, such as general decontamination and symptomatic treatment. Gastric lavage was performed on 43.1% of children and 67.4% of patients received activated charcoal. 29.2% of patients received antidote. Significant differences were observed in the management approach. Gastric lavage was more frequently performed in intentional poisonings (47.1% vs. 15.1%, $p < 0.001$), as was administration of activated charcoal (72.9% vs. 29.1%, $p < 0.001$). Antidote use was also more common in intentional cases (30.7% vs. 19.1%, $p = 0.02$). Majority of patients discharged from toxicological ward with recovery. The median (IQR) duration of hospitalization was 17 (12-25) hours. Only one mortality reported in the intentional poisoning group. No significant differences was observed in terms of ICU admission, intubation, duration of hospitalization and outcome between two studied group ($P > 0.05$).

Table 4. Physical examination upon admission, treatment measures and outcome of patients based on type of exposure

Variables	Variable Categories	Total	Intentional	Accidental	P-value
Level of consciousness	Normal	596 (86.5%)	528 (87.9%)	68 (77.3%)	0.031
	Confusion/Delirium	30 (4.4%)	23 (3.8%)	7 (8.0%)	
	Lethargy	30 (4.4%)	24 (4.0%)	6 (6.8%)	
	Obtundation	7 (1.0%)	7 (1.2%)	0 (0.0%)	
	Stupor	18 (2.6%)	14 (2.3%)	4 (4.5%)	
	Coma	8 (1.2%)	5 (0.8%)	3 (3.4%)	
SBP	Mean (SD)		121.2 $\pm$ 16.3	120.0 $\pm$ 15.6	0.53
DBP	Mean (SD)		76.1 $\pm$ 12.0	73.9 $\pm$ 9.3	0.04
HR	Mean (SD)		91.9 $\pm$ 29.9	91.1 $\pm$ 18.0	0.80
RR	Mean (SD)		18.1 $\pm$ 9.9	19.0 $\pm$ 10.9	0.46
Temperature	Mean (SD)		38.01 $\pm$ 19.04	36.93 $\pm$ 0.35	0.59
Pupil	Normal	540 (80.0%)	478 (81.2%)	62 (72.1%)	0.11
	Miosis	65 (9.6%)	55 (9.3%)	10 (11.6%)	
	Mydriasis	70 (10.4%)	56 (9.5%)	14 (16.3%)	
Nausea/Vomiting	Yes	203 (29.3%)	178 (29.5%)	25 (28.1%)	0.78
	No	489 (70.7%)	425 (70.5%)	64 (71.9%)	
Abdominal pain	Yes	62 (9.0%)	51 (8.5%)	11 (12.4%)	0.23
	No	630 (91.0%)	552 (91.5%)	78 (87.6%)	
Diarrhea	Yes	14 (2.0%)	13 (2.2%)	1 (1.1%)	0.52

	No	678 (98.0%)	590 (97.8%)	88 (98.9%)	
Gastric lavage	Lavage	293 (43.1%)	280 (47.1%)	13 (15.1%)	<0.001
	Other treatment	387 (56.9%)	314 (52.9%)	73 (84.9%)	
Charcoal	Charcoal	458 (67.4%)	433 (72.9%)	25 (29.1%)	<0.001
	Other treatment	222 (32.6%)	161 (27.1%)	61 (70.9%)	
Antidote	Yes	202 (29.2%)	185 (30.7%)	17 (19.1%)	0.025
	No	490 (70.8%)	418 (69.3%)	72 (80.9%)	
ICU	Both	26 (3.8%)	22 (3.6%)	4 (4.5%)	0.70
	Ward only	666 (96.2%)	581 (96.4%)	85 (95.5%)	
Intubation	Yes	15 (2.2%)	12 (2.0%)	3 (3.4%)	0.30
	No	677 (97.8%)	591 (98.0%)	86 (96.6%)	
Length of stay	Mean (SD)		28.41 (44.91)	23.97 (27.07)	0.36
Outcome	Recovery	691 (99.9%)	602 (99.8%)	89 (100.0%)	0.87
	Mortality	1 (0.1%)	1 (0.2%)	0 (0.0%)	

To identify factors associated with intentional poisoning among children, logistic regression analyses was performed (Table 3). In the unadjusted model, female gender (OR: 3.45; 95% CI: 2.17–5.47; $p < 0.001$), history of psychiatric disease (OR: 3.24; 95%CI 1.59-6.60), history of suicide (OR: 9.83; 95% CI: 3.07–31.54; $p < 0.001$), and self-harm (OR: 3.02; 95% CI: 1.08–8.47; $p = 0.036$) were significantly associated with increased odds of intentional poisoning compared to accidental poisoning. Regarding addiction subtype, none of the addiction categories showed a statistically significant association with intentional poisoning. The association between self-harm and intentional poisoning did not remain statistically significant in the multivariable model.

Table 5. Logistic regression analysis of factors associated with intentional poisoning compared to accidental poisoning among children with acute poisoning.

		Unadjusted OR		Multivariable model	
		OR (95% CI)	P-value	OR (95% CI)	P-value
Gender	Female	3.45 (2.17-5.47)	<0.001	3.40 (2.12-5.46)	<0.001
	Male	1	-	1	-
Psychiatric disease history	Yes	3.24 (1.59-6.60)	0.01	2.18 (1.01-4.67)	0.04
Suicide history	Yes	9.83 (3.07-31.54)	<0.001	6.29 (1.89-20.96)	0.003
Self-harm history	Yes	3.02 (1.08-8.47)	0.036	1.46 (0.48-4.40)	0.50
Type of addiction	Opioid	1	-	-	-
	Stimulant	5.00 (0.21-117.89)	0.32		
	Polysubstances	4.29 (0.34-53.53)	0.26		
	Smoking	5.42 (0.43-68.82)	0.19		
	Alcohol	0.70 (0.049-10.01)	0.79		
	Other type of addiction	4.00 (0.17-95.76)	0.39		

Discussion

This study provides valuable insight into the determinants of acute intentional poisoning among adolescents in a major referral toxicology center in Iran. To the best of our knowledge, this is the first study in our region focusing on adolescents engaging in self-poisoning. The strength of our research lies in the large sample size of targeted patients.

Consist with previous research our finding showed that intentional poisoning is more frequent than accidental poisoning in this age group⁽²⁾, accounting for nearly 9 out of every 10 cases. Adolescence is a periode of life where individuals are faced with new circumstances and are trying to cope with new emotions and experiences, often turning to alcohol, medications and drugs⁽²⁾. Exposure to adversity, peer pressure to conform, and the exploration of identity put adolescents under stress. On the other hand Physical, emotional and social changes could make adolescence vulnerable to mental health problems⁽¹⁷⁾.

Our finding revealed that female sex, suicide history, psychtaric disease history were significantly associated with acute intentional poisoning among adolescence.

A history of psychiatric disease nearly doubles the likelihood of acute intentional poisoning among adolescents compared to accidental poisoning. According to WHO one in seven individuals aged 10-19 years old expriences a mental disorder⁽¹⁷⁾. A retrospective chart review of adolescents aged 12 to 17 revealed that 67% of all deliberate self poisoning cases had a history of psychiatric conditions, with depression being the most common (57%)⁽¹⁸⁾. Pushpakumara reported a fivefold increased risk of deliberate self-poisoning among 10-19-year-old females with borderline personality traits⁽¹⁹⁾.

Our findings revealed that female gender was significantly associated with intentional self-poisoning among adolescence with increased odds of intentional poisoning 3.4 times higher compared to accidental poisoning. This is consistent with global patterns showing that non-fatal self-poisoning was more common among the female adolescent⁽⁷⁾. It is reported that the rates of non-fatal suicidal behaviour are three times higher in females than in males^(20, 21). This can be attributed to the typically earlier physical and mental development of girls, along with gender-based variations in emotional and behavioral challenges⁽⁷⁾. Differences in pubertal stages between males and females combined with a period of particular neurodevelopmental vulnerability around this time, or gender differences in dealing with distress with self-harm appearing more acceptable amongst girls as a coping mechanism whereas boys tend towards other problem or disruptive behaviours instead^(22, 23).

Our results showed that a history of suicide increased the odds of intentional poisoning among adolescents by nearly six times. Previous studies have also reported a similar pattern, with the majority of patients having a history of previous suicide attempts in the same or a similar manner⁽²⁾. Suicide is the third leading cause of death among adolscence⁽¹¹⁾. Drug abuse, juvenile delinquency, poor academic performance, teenage pregnancy, sexually transmitted diseases, and feelings of despair are common factors that drive teenagers to increasingly turn to suicide attempts through various forms of acute self-poisoning⁽²⁴⁾. Pediatricians should be educated on the signs of depression and suicidal behavior, as well as the importance of early intervention.

Our study have several limitations. First, the retrospective nature of our study limits our ability to establish causal relationships and relies on the accuracy and completeness of existing medical records. Second, the study was conducted in a single tertiary referral center specializing in toxicology, which may not be representative of the broader adolescent population across Iran. Third, while the registry included a wide range of variables, some potentially relevant psychosocial factors, such as family background, socioeconomic status, exposure to violence, school performance were not registered, limiting our investigation regarding the broader contextual influences on intentional poisoning behavior.

Declarations

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Rokhsareh meamar reports financial support was provided by Isfahan University of Medical Sciences. Rokhsareh meamar reports a relationship with Isfahan University of Medical Sciences that includes: employment. Rokhsareh meamar has patent 240413 licensed to IR.ARI.MUI.REC.1404.046.

Competing interests

No If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Ethics approval and consent to participate

This research has been performed in accordance with the Declaration of Helsinki and has been approved by the ethics committee of Isfahan University of Medical Sciences (Ethics code: IR.ARI.MUI.REC.1404.046).

Consent for publication

All authors approved the final version of the manuscript.

Availability of data and material

The data that support the findings of this study are available on request from the corresponding author.

Clinical trial number: not applicable.

Code availability

'Not applicable'

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All authors approved the final version of the manuscript.

Abbreviations

WHO: World health organization

KHPEC: Khorshid Hospital's Poisoning Emergency Center

IQR : interquartile range

OR : odds ratio

CI :confidence interval

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Methadone versus Tramadol Toxicity: Epidemiological Profile and Risk Factors in an Iranian Tertiary Care Center

36

ABSTRACT

Background: Understanding their distinct epidemiological and clinical profiles of Methadone and tramadol poisoning is essential for targeted prevention and management. This study aimed to compare demographic characteristics, risk factors, and outcomes of methadone and tramadol toxicity.

Methods: This cross-sectional study reviewed medical records of patients admitted with methadone or tramadol poisoning to Khorshid Hospital, Isfahan, Iran, between May 5, 2023, and May 5, 2024. Demographic variables, toxicological, clinical features, and outcomes were analyzed and compared. Logistic regression was used to identify factors associated with tramadol versus methadone poisoning.

Results: Among 547 patients, 464 (84.8%) had methadone toxicity and 83 (15.2%) had tramadol toxicity. Methadone poisoning predominantly affected males (79.3%) and middle-aged adults (40–65 years), whereas tramadol cases were more frequent in younger adults (20–40 years) with a near-equal gender distribution. Addiction history was significantly more common in methadone cases (71.3% vs. 44.6%), while intentional poisoning was more prevalent in tramadol cases (79.5% vs. 58.0%). Logistic regression showed that prior addiction history was inversely associated with tramadol poisoning (OR = 0.32), while smoking history demonstrated a strong positive association (OR = 8.5) compared to methadone. Male sex was associated with lower odds (OR = 0.35), whereas university education (OR = 6.6) was associated with higher odds of tramadol poisoning. All fatalities (1.9%) occurred in the methadone group.

Conclusion: Addiction status, smoking history, education level, gender, and age are key factors differentiating tramadol from methadone toxicity. These findings support substance-specific prevention strategies and highlight the need for multicenter longitudinal studies.

Keywords: Methadone, Tramadol, Opioid toxicity, Poisoning, Epidemiology, Iran

Introduction

Substances derived from poppy seeds, along with their semi-synthetic and synthetic analogues that interact with brain opioid receptors, are classified as opioids or narcotics (1). These compounds, valued for their analgesic and sedative properties, serve dual purposes: pain management and addiction treatment, with specific formulations such as opium syrup, methadone, and buprenorphine being utilized for the latter. The euphoric effects of opioids contribute significantly to their non-medical usage (2). However, these substances pose serious risks, particularly through their respiratory depressant effects, which can prove fatal in cases of overdose (3).

Global statistics indicate that drug use accounts for approximately 500,000 deaths worldwide, with opioid-related overdoses and poisoning responsible for over 30% of these fatalities (4).

In 2020, opioids were responsible for 75% of fatal drug poisonings in the United States(5, 6). The CDC's National Center for Health Statistics estimates that over 80,000 drug overdose deaths occurred in the United States in 2024(7).

This global pattern is reflected in many Middle Eastern countries, and Iran is no exception, where the opioid burden is further shaped by its unique geographic position, widespread substitution therapies, and long-standing exposure to illicit opioid trafficking routes. Iran's geographical proximity to Afghanistan and Pakistan, sharing nearly 2000 km of border, has contributed to its designation by the United Nations as one of the countries with the highest rates of drug-related crime (8) . Opioid poisoning is among the leading cause of acute poisoning in many parts of Iran (9-11). According to a systematic review and meta-analysis of studies reporting specific poisoning agents among acute poisoning cases from 1990 to 2020 opium poisoning was found to be the most prevalent poisoning(12). In a four-year study, opioids emerged as the predominant cause of poisoning among elderly patients hospitalized in Iran (13).

Among various opioids, methadone and tramadol have emerged as the two most frequently encountered substances in toxicity cases in Iran (14).

National toxicology data indicate that methadone accounts for 60–80% of opioid-related poisoning admissions, whereas tramadol represents approximately 10–20% (15, 16). These numerical patterns underscore the disproportionate impact of these two agents and justify.

Given the significant prevalence of these specific opioids and their associated toxicity incidents, both intentional and unintentional, we conducted this study to examine the epidemiological patterns of methadone and tramadol poisoning at a tertiary care center in Isfahan, Iran.

Although both methadone and tramadol are classified as opioids, their pharmacological properties differ substantially. Methadone is a long-acting μ -opioid receptor agonist with a prolonged and highly variable half-life, predisposing patients to delayed respiratory depression and cardiac complications such as QT-interval prolongation and torsades de pointes(17). Tramadol, in contrast, exerts mixed mechanisms weak μ -opioid agonism combined with inhibition of serotonin and norepinephrine reuptake which contributes to its known risk of seizures and serotonin toxicity, particularly in overdose (18). These divergent pharmacodynamic features further justify separate epidemiological assessment.

Although opioid poisoning is recognized as a major public health problem in Iran, the comparative epidemiological and clinical profiles of methadone and tramadol toxicity have not been clearly delineated. The present study provides evidence to clarify these differences.

Methods

Study Design and Setting

We conducted current secondary analysis, registry-based study of patients with acute poisoning admitted to the poisoning emergency center of Khorshid Hospital in Isfahan; the leading regional referral center for poisoned patients in central Iran between May 5, 2023, and May 5, 2024, in accordance with the principles of the Declaration of Helsinki and with approval from the Ethics Committee of Isfahan University of Medical Sciences (Ethics code: IR.ARI.MUI.REC.1403.221). Its data were extracted from the poisoning registry of Isfahan University of Medical Sciences, which was established in 2021 under ethical approval (Ethics code: IR.MUI.MED.REC.1400.097).

The inclusion criteria were patients admitted to the toxicology emergency of Khorshid Hospital with self-report of methadone or tramadol abuse or report of companions or relatives if the patient is unconscious.

However, final case confirmation was not based solely on self-report. All diagnoses were made by a clinical toxicologist using standardized clinical criteria, including the compatible opioid toxidrome, response to naloxone when applicable, and exclusion of alternative causes. In cases with diagnostic uncertainty or when co-ingestion was suspected, analytical toxicology testing available at the poisoning center was used to support diagnostic confirmation. Patients who co-ingested other opioids or had concurrent diagnoses of other poisonings were excluded. The final diagnosis is based on the opinion of a board-certified toxicologist. Patients who co-ingested other opioids or also had a diagnosis of other poisonings were excluded from the study. Patient with incomplete data record more than 20% were also excluded from this study.

Variables and Definitions

Using a structured data collection form, we gathered information on multiple parameters. Demographic characteristics included gender, age, marital status, and educational level (illiterate, elementary / high school / university). Clinical and toxicological parameters encompassed the type of exposure (oral, intravenous, multiple), intent of poisoning was classified as intentional (suicidal), accidental, or caused by others (intentional or unintentional), substance use history (including opioids, stimulants, alcohol, cigarettes, and other substances), and clinical outcome (in-hospital mortality).

Statistical Analysis

Data analysis was performed using SPSS software version 21 for Windows (SPSS Inc., Chicago, IL, USA). Normally distributed numerical variables were presented as means with standard deviations, while non-normal variables were reported as medians with interquartile ranges (IQR: first quartile (Q1) and third quartile (Q3)). Categorical variables were expressed as frequencies and percentages. The Kolmogorov-Smirnov test and Q-Q plots were used to assess the normality of distributions. For group comparisons, independent samples t-test was applied to normally distributed data, and the Mann-Whitney U test was used for non-normal data. Homogeneity of

variances was evaluated using Levene's test, and when violated, the Welch test was conducted. Categorical variables were compared using chi-square tests or Fisher's exact test when appropriate. To identify independent predictors of methadone versus tramadol poisoning, binary logistic regression analysis was performed. Variables with p-values <0.05 in univariate analyses were entered into the multivariable model. Model adequacy was assessed using the pseudo R² indices (Cox & Snell R² and Nagelkerke R²). The predictive performance of the model was further evaluated using the classification table (overall accuracy). In addition, multicollinearity diagnostics were conducted by examining tolerance values and variance inflation factors (VIF), ensuring that collinearity among predictors did not bias the regression estimates. Odds ratios (ORs) with 95% confidence intervals (CIs) were reported to quantify the strength of associations. All statistical analyses were conducted using two-tailed tests, with statistical significance set at p<0.05.

Results

A total of 547 cases of opioid toxicity were analyzed, comprising 464 (84.83%) methadone and 83 (15.17%) tramadol cases. Significant demographic and clinical differences were observed between the two groups (p<0.001).

Table 1 presents the demographic characteristics of methadone and tramadol toxicity patients. The majority of methadone toxicity cases occurred in males (79.3%), while tramadol cases showed a more balanced gender distribution with 49.4% female patients (p<0.001). Age distribution varied significantly between groups (p<0.001), with methadone cases predominantly occurring in middle-aged adults (40-65 years: 40.2%), while tramadol cases were concentrated in younger adults (20-40 years: 79.5%). Marital status showed a significant difference between groups (p=0.01), with methadone cases having a higher proportion of married individuals (56.64% vs 42.17%), while tramadol cases had a higher proportion of single individuals (57.83% vs 43.36%).

Educational background differed significantly between groups (p<0.001). In both groups, the majority of patients had under-diploma education or a diploma degree. However, Tramadol cases showed a higher proportion of college-educated individuals (19.7%) compared to Methadone cases (6.5%).

Addiction history was more prevalent in methadone cases (71.3%) compared to tramadol cases (44.6%) (p<0.001). The pattern of substance use varied significantly between groups (p<0.001). Among those with addiction, smoking was more common in tramadol cases (45.9%), while opioid use was more prevalent in methadone cases (39.4%). The oral route was the predominant method of exposure in both groups (>98%), with no significant difference between them (p=0.49). However, the intention behind poisoning differed significantly (p<0.001). Intentional poisoning was more common in both group of poisoning cases (79.5% and 58.0% in tramadol and methadone cases, respectively). While patients with methadone toxicity had a higher prevalence of past medical history (28.3% vs. 19.3%), criminal history (8.4% vs. 3.6%) and history of psychiatric disease these differences did not reach statistical significance. Notably, suicide history was significantly more common in the tramadol group (21.7% vs. 12.7%, p=0.031).

Table 2 presents the comparison between clinical characteristics, management, and outcomes of patients with methadone and tramadol toxicity.

1 The majority of patients in both groups presented with normal consciousness (72.1% in methadone
2 vs. 85.5% in tramadol, $p=0.130$). However, more severe alterations in consciousness, including
3 stupor and coma, were frequent in the methadone group without significant difference ($p>0.05$).
4 The mean Glasgow Coma Scale (GCS) score was significantly lower in the methadone group
5 (13.75 ± 2.52 vs. 14.46 ± 1.70 , $p=0.014$).

6 Pupillary findings showed significant differences between groups ($p<0.001$), with myosis being
7 the predominant finding in methadone toxicity (52.9% vs. 25% in tramadol), while mydriasis was
8 more prevalent in tramadol toxicity (12.5% vs. 3.8%).

9 Nausea and vomiting were significantly more common in tramadol toxicity (26.5% vs. 14.7%, p
10 $=0.008$). Similarly, abdominal pain was more frequent in the tramadol group (8.4% vs. 2.6%,
11 $p=0.018$). No significant difference was observed in terms of neurological examination

12 Patients with tramadol toxicity presented with significantly higher vital signs compared to the
13 methadone group, including higher body temperature ($37.87 \pm 9.12^{\circ}\text{C}$ vs. $36.95 \pm 0.33^{\circ}\text{C}$,

14 $p=0.029$), systolic blood pressure (126.82 ± 18.58 vs. 122.21 ± 19.45 mmHg, $p=0.047$), diastolic
15 blood pressure (80.51 ± 13.38 vs. 77.05 ± 12.94 mmHg, $p=0.027$), and heart rate (98.99 ± 18.22
16 vs. 91.50 ± 18.08 beats/min, $p<0.001$). Eight patients with tramadol poisoning were hospitalized
17 with the chief complaint of seizures; however, no seizures were observed in the methadone
18 poisoning group (not mentioned in the table).

19 Significant differences were observed in the management approaches. Activated charcoal
20 administration (66.3% vs. 24.4%, $p<0.001$) and gastric lavage (42.2% vs. 9.5%, $p<0.001$) were
21 more frequently performed in tramadol toxicity cases. Conversely, antidote administration
22 (primarily naloxone) was significantly more common in methadone toxicity (68.3% vs. 25.3%,
23 $p<0.001$).

24 No significant difference was observed in ICU admission ($p>0.05$). The length of hospitalization
25 was significantly longer in methadone toxicity cases (53.13 ± 78.93 vs. 29.01 ± 50.99 hours, p
26 $=0.007$)

27 There was no significant difference in psychiatric outcomes between groups ($p=0.235$). The
28 majority of patients in both groups were discharged. 1.6% of patients died. All deaths occurred in
29 the methadone group (1.9% of methadone cases), while all tramadol cases recovered completely
30 ($p<0.001$).

31 The logistic regression analysis demonstrated that several variables significantly influenced the
32 likelihood of being in the tramadol versus methadone group (Table 3). Addiction history was a
33 strong protective factor: individuals with a prior history of addiction were substantially less likely
34 to present with tramadol poisoning compared to methadone (OR = 0.32, $p<0.001$). Regarding the
35 type of addiction, smoking showed a very strong association with tramadol poisoning (OR ≈ 8.5 ,
36 $p=0.002$), while polysubstance use indicated a possible increase in odds but did not reach
37 conventional significance (OR = 3.5, $p=0.072$).

38 Educational level also played a role: those with university education had markedly higher odds of
39 tramadol poisoning compared to elementary individuals (OR = 6.6, $p=0.002$). In contrast, male

gender was associated with significantly lower odds (OR = 0.35, p = 0.036), suggesting that females were more likely to be in the tramadol group.

Age showed a marginally significant effect (OR = 0.96, p = 0.073), indicating that with each additional year of age, the odds of tramadol poisoning slightly decreased. Although this effect did not reach strict statistical significance, it suggests a possible trend where younger individuals may be more prone to tramadol-related poisoning (Table 3).

Other variables such as marital status, intention (accidental vs. intentional), and suicide history did not show significant associations. Overall, the model explained about one-third of the variance (Nagelkerke $R^2 = 0.331$) and achieved a high classification accuracy of 86.6%, highlighting that addiction history, type of addiction, education, gender, and possibly age are the most relevant predictors in distinguishing tramadol from methadone poisoning cases.

Discussion

This study examined the epidemiological patterns of methadone and tramadol toxicity cases at a tertiary care center in Isfahan, Iran. To the best of our knowledge, this is the first comparative analysis specifically between methadone and tramadol toxicity patterns conducted in Isfahan, Iran. Addiction history, type of addiction, education, gender, and possibly age are the most relevant predictors in distinguishing tramadol from methadone poisoning cases

Our study found a marked gender disparity in methadone toxicity, with males comprising the majority of cases, while tramadol cases showed a more balanced gender distribution with significantly lower odds for male gender. This male predominance in methadone toxicity aligns with previous studies from Iran, particularly those conducted in Isfahan and Tehran. Eizadi-Mood et al. reported similar gender distributions in their cohort study of methadone toxicity patients in Isfahan, where males constituted the majority of cases (19). The higher proportion of males in methadone toxicity cases might be attributed to the greater prevalence of opioid use disorder among Iranian men and their increased access to methadone through maintenance treatment programs. The concentration of tramadol cases in younger adults may be related to its widespread prescription for pain management and its potential for misuse, especially in younger populations seeking non-medical pain relief. Tramadol's dual mechanism of action as a "weak μ -opioid agonism and inhibition of serotonin and norepinephrine reuptake" may further enhance its abuse potential among younger individuals(20).

The age distribution in our study showed distinct patterns between the two substances. Tramadol toxicity predominantly affected younger adults with a marginally significant effect in logistic regression (OR = 0.96, p = 0.073), indicating that with each additional year of age, the odds of tramadol poisoning slightly decreased, while methadone toxicity showed a broader age distribution. This finding is consistent with recent data from Northern Iran, where Ramezanzadeh et al. reported a mean age of 34.4 years for opioid poisoning cases, with methadone being the most prevalent type (14). The concentration of tramadol cases in younger age groups may reflect its status as a commonly prescribed analgesic and its potential for misuse among younger populations, probably because they take risks and do not know much about its dangers (21). In contrast, older individuals with opioid dependence are often more engaged with formal treatment service with methadone(22).

1 A significant finding in our study was the higher rate of intentional poisoning in tramadol cases
2 (79.5%) compared to methadone (58.0%). This pattern parallels findings from Tehran, where
3 Behnoush et al. documented substantial rates of intentional methadone overdose, though with
4 different proportions. The higher rate of accidental exposure in methadone cases (39.9%) aligns
5 with previous research highlighting the risks associated with methadone maintenance therapy and
6 household exposure. Studies have shown that among methadone exposure cases, approximately
7 25.5% were patients under surveillance of Methadone maintenance therapy centers, while 34.5%
8 were non-addicts, indicating significant accidental exposure risks (23). This is particularly
9 concerning in household settings, where liquid formulations of methadone pose an increased risk
10 of accidental ingestion, especially among children (24). This misperception, combined with its
11 relatively easier access of tramadol through outpatient prescriptions or informal markets, may
12 facilitate its use in intentional self-harm, particularly among younger individuals with
13 psychological distress(25)

14 The mortality rate in our study was exclusively associated with methadone toxicity, while all
15 tramadol cases recovered completely. This finding is particularly noteworthy when compared to
16 previous studies from Isfahan, where Eizadi-Mood et al. documented varying mortality rates in
17 methadone toxicity cases (19). The absence of mortality in tramadol cases, despite its frequent
18 intentional misuse, suggests a relatively better safety profile compared to methadone, though this
19 should not minimize the potential dangers of tramadol abuse.

20 The patterns observed in our Isfahan-based study align with broader Iranian epidemiological
21 trends. A recent Bayesian spatial analysis of illicit-drug-related mortality across Iran identified
22 Isfahan among provinces with elevated relative risk for drug-related deaths (26), supporting the
23 representativeness of our findings. Furthermore, national post-mortem toxicology data from the
24 Iranian Forensic Medicine Organization (2015-2017) reported methadone detection in
25 approximately 50% of substance-related deaths nationwide (27), consistent with the high burden
26 of methadone toxicity observed in our tertiary care center. These multi-regional data suggest that
27 our findings may be generalizable to other Iranian urban centers with similar demographic and
28 substance use profiles.

29 Our findings revealed significant differences in educational status between the two groups, with
30 tramadol cases showing a higher proportion of college-educated individuals compared to
31 methadone cases. This educational disparity has not been extensively documented in previous
32 Iranian studies, suggesting a potentially important area for further research regarding the
33 relationship between educational status and patterns of opioid misuse.

34 The relationship between educational attainment and overdose mortality deserves deeper
35 examination in light of international evidence. Although Iranian epidemiological data on education
36 and opioid mortality are limited, similar socioeconomic gradients have been reported
37 internationally (28).

38 The significantly higher prevalence of substance use disorders among methadone-poisoned
39 patients compared to tramadol cases in our study can be explained by methadone's accessibility
40 patterns. Our findings align with previous research showing that a substantial proportion of
41 methadone poisoning cases involve individuals with pre-existing substance use disorders, who
42 obtain the drug through both legitimate Methadone Maintenance Treatment (MMT) programs and
43 illicit markets. Unlike tramadol, which is primarily prescribed for pain management with stricter

dispensing controls, methadone's dual availability through MMT centers and illegal markets creates increased exposure opportunities for individuals with addiction history. This is further complicated by the timing of poisoning incidents, which often coincide with the initiation of addiction treatment or withdrawal periods, highlighting the need for enhanced monitoring systems and stricter controls on methadone distribution while maintaining necessary access for therapeutic purposes (29, 30).

Nausea and vomiting were significantly higher in the tramadol group in the present study. In another study on tramadol toxicity patients, 29.9% of the cases experienced nausea which is near to the observed proportion in our study (26.5%) (31).

In the present study, vital sign values (SBP, DBP, HR, and RR) were lower in the methadone group compared with the Tramadol group. There is a scarcity of evidence on this comparison in the previous studies. However, some previous studies have separately reported the vital signs for Methadone and Tramadol toxicity patients; in a previous cross-sectional study on 390 cases of Methadone toxicity, the mean $\pm$ SD values for SBP, DBP, HR, and RR were 114.14 ± 15.81 , 70.04 ± 10.14 , 87.5 ± 14.32 , and 12.79 ± 4.90 , respectively (32). In another study on 75 patients with Tramadol toxicity, the mean $\pm$ SD values for SBP, DBP, HR, and RR were 121.5 ± 14.3 , 77.2 ± 10.4 , 89.9 ± 16.6 , and 15.4 ± 2 , respectively (31). The observed values in previous studies are consistently lower than the values obtained in our study. These differences could originate from the possible differences in the mean administered dose by the study samples, different vital sign monitoring systems, and different demographic and baseline characteristics of the patients in these studies.

Our study has several notable strengths. First, it includes a large sample of methadone and tramadol toxicity patterns, drawing data from the only referral poisoning center in Isfahan province. This provides a robust representation of toxicity patterns in this region. Second, our study's comparative analysis of methadone and tramadol toxicity offers enlightening insights into the distinct characteristics and outcomes associated with these commonly misused opioids, contributing valuable information for targeted intervention strategies.

However, several limitations should be considered when interpreting our findings. First, as a single-center study, our results may not be fully generalizable to other regions of Iran or different healthcare settings. Second, the retrospective nature of the study means we relied on previously recorded medical data, which may have led to missing information or documentation inconsistencies. Another limitation of our study is that, although we performed multivariable binary logistic regression to adjust for several independent predictors, residual confounding cannot be fully excluded. For example, the potential interplay between age and addiction history may still influence the observed associations. In addition, some categorical variables with sparse levels (i.e., very few cases in certain categories) were excluded from the regression model to avoid unstable estimates, which may limit the generalizability of findings. Finally, age was modeled as a continuous variable rather than categorical, which improves statistical power but may overlook non-linear effects. Fourth, we could not assess long-term outcomes as our data was limited to in-hospital periods. Finally, the study's cross-sectional design prevents us from establishing causal relationships between the identified risk factors and toxicity outcomes.

Conclusion

Our findings demonstrate distinct epidemiological patterns between methadone and tramadol toxicity cases in Isfahan, Iran. Methadone and tramadol toxicity cases display distinct

epidemiological patterns, addiction history, type of addiction, education, gender, and possibly age are the most relevant predictors in distinguishing tramadol from methadone poisoning cases. These findings suggest the need for differentiated prevention strategies and targeted interventions for these two types of opioid toxicity, enhanced safety measures and monitoring for methadone maintenance programs, particularly focusing on accidental exposure prevention, and strengthened prescription control and awareness programs for tramadol, especially targeting younger adults. Long-term or multi-center follow-up studies is needed.

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Table 1. Demographic characteristics of patients with Methadone and Tramadol toxicity

Variables		Total (N= 547)	Methadone (464)	Tramadol (N = 83)	P-value
Sex	female	137 (25.10)	96 (20.7)	41 (49.40)	< 0.001
	male	410 (74.9)	368(79.3)	42 (50.60)	
Age (year)	< 20	61 (11.20)	52 (11.30)	9 (10.80)	< 0.001
	20 – 40	239 (44.00)	173 (37.60)	66 (79.50)	
	40 – 65	191(35.20)	185 (40.20)	6 (7.20)	
	≥ 65	52 (9.60)	50 (10.90)	2 (2.40)	
Marital status	Single	247 (45.57)	199 (43.36)	48 (57.83)	0.015
	Married	295 (54.43)	260 (56.64)	35 (42.17)	
Education	Illiterate	30 (6.10)	29 (7.00)	1 (1.30)	< 0.001
	Elementary	256 (52.00)	224 (53.80)	32 (42.10)	

	High school	164 (33.30)	136 (32.70)	28 (36.80)	
	University	42 (8.50)	27 (6.50)	15 (19.70)	
Addiction type	Stimulant	12 (3.30)	11 (3.3)	1 (2.7)	< 0.001
	Opioid	134 (36.50)	30 (39.40)	4 (10.80)	
	Smoking	62 (16.90)	45 (13.60)	17 (45.90)	
	Others drugs	22 (6.00)	21 (6.40)	1 (2.70)	
	Poly-substance	132 (36.00)	1.9 (36.10)	13 (35.10)	
Exposure route	Oral	540 (99.30)	458 (99.30)	82 (98.80)	0.49
	multiple	2 (0.40)	2 (0.04)	0 (0)	
Addiction history(yes)		367 (61.20)	330 (71.30)	37 (44.60)	< 0.001
Past medical history(yes)		147 (26.9)	131 (28.3)	16 (19.3)	0.088
Psychiatric history(yes)		109 (20)	94 (20.3)	15 (18.1)	0.640
Self-harm history (yes)		32 (5.9)	28 (6)	4 (4.8)	0.661
Criminal history(yes)		42 (7.7)	39 (8.4)	3 (3.6)	0.130
Suicide history(yes)		77 (14.1)	59 (12.7)	18 (21.7)	0.031
Intention	Accidental	200 (36.90)	183 (39.90)	17 (20.50)	< 0.001
	Caused by others	10 (1.80)	10 (2.20)	0 (0)	
	Intentional	332 (61.30)	286 (58.00)	66 (79.50)	
Number of previous suicides attempted		1.71 ± 1.11 1(1-2)	1.79 ± 1.29	1.44 ± 0.62	0.596

		1(1-2)	1(1-2)	
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The data are presented as mean $\pm$ SD for normality distributed continuous data and mean $\pm$ SD along with median (IQR) for non-normal data or number (percent) for categorical variables. Independent samples t-test or non-parametric Mann-Whitney U, chi-square / Fisher's exact test was used for analysis where appropriate. statistical significance set at P<0.05.

Table 2. Clinical manifestations and treatments modalities of patients with Methadone and Tramadol toxicity

	Total (N=547)	Methadone (N = 464)	Tramadol (N = 83)	p-value
Consciousness	Alert	405 (74.2)	334 (72.1)	71 (85.5)
	Confusion	39 (7.1)	35 (7.6)	
	Lethargy	47 (8.6)	41 (8.9)	
	Obtundation	18 (3.3)	17 (3.7)	
	Stupor	28 (5.1)	27 (5.8)	
	Coma	9 (1.6)	9 (1.9)	
GCS	13.86 $\pm$ 2.42	13.75 $\pm$ 2.52	14.46 $\pm$ 1.70	0.014
Nausea or vomiting	90 (16.5)	68 (14.7)	22 (26.5)	0.008
Pupil size	Normal	246 (46.2)	196 (36.8)	50 (62.5)
	Myosis	259 (48.7)	239 (52.9)	
	Mydriasis	27 (5.1)	17 (3.8)	
Pupil Reflex	542 (99.3)	459 (99.1)	83 (100)	0.395
Abnormal Lung auscultation	29 (5.3)	28 (6)	1 (1.2)	0.070
Abnormal Heart auscultation	55 (10.1)	42 (9.1)	13 (15.7)	0.066
Temperature	37.09 $\pm$ 3.57	36.95 $\pm$ 0.33	37.87 $\pm$ 9.12	0.029

SBP (mmHg)		122.90 ± 19.38	122.21 ± 19.45	126.82 ± 18.58	0.047
DBP (mmHg)		77.57 ± 13.06	77.05 ± 12.94	80.51 ± 13.38	0.027
Heart rate		92.64 ± 18.28	91.50 ± 18.08	98.99 ± 18.22	<0.001
Respiratory rate		16.58 ± 6.60	16.54 ± 7.10	16.76 ± 2.35	0.785
O2 saturation		90.48 ± 34.81 93(85-96)	89.82 ± 37.70 92(82-69)	94.17 ± 5.14 95(94-97)	< 0.001
Hospitalization length (hours)		49.47 ± 75.81 24(15-43)	53.13 ± 78.93 28(16-49)	29.01 ± 50.99 18(12-27)	< 0.001
Activated Charcoal		165 (30.9)	110 (24.4)	55 (66.3)	<0.001
Gastric Lavage		78 (14.6)	43 (9.5)	35 (42.2)	<0.001
Antidote administration		337 (61.7)	316 (68.3)	21 (25.3)	<0.001
Endotracheal Intubation		26 (4.8)	21 (4.5)	5 (6)	0.558
Outcome	Recovery	495 (98.40)	420 (98.10)	75 (100)	< 0.001
	mortality	8 (1.60)	8 (1.90)	0 (0)	

Glasgow Coma Scale (GCS), Systolic blood pressure (SBP), Diastolic blood pressure (DBP)

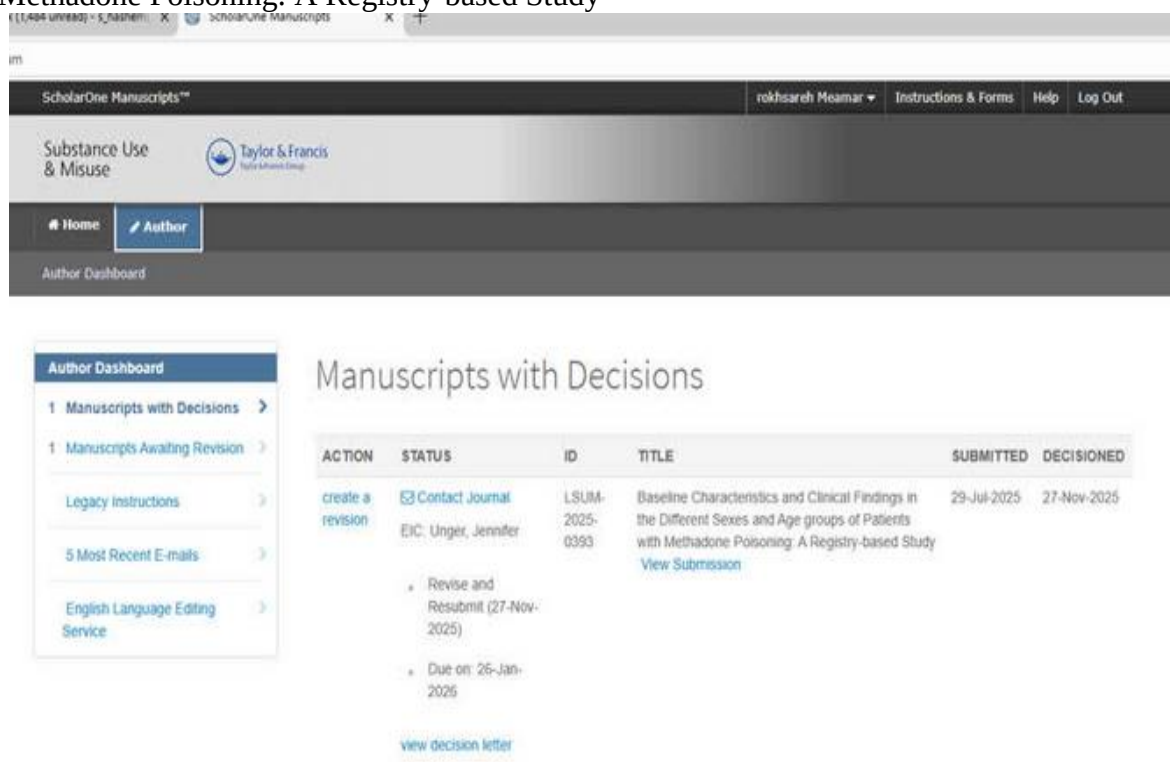
The data are presented as mean ±SD for normality distributed continuous data and mean ±SD along with median (IQR) for non-normal data or number (percent) for categorical variables. Independent samples t-test or non-parametric Mann-Whitney U, chi-square / Fisher's exact test was used for analysis where appropriate. statistical significance set at P<0.05.

Table 3. Independent predictors of methadone and tramadol poisoning: Logistic regression results

Variable	OR	95% CI for OR	p-value
Addiction history (Addict)	0.324	0.201 – 0.523	<0.001
Type of addiction (Smoking)	8.470	2.124 – 33.782	0.002
Type of addiction (Polysubstance)	3.494	0.894 – 13.653	0.072
Marital status (Married)	1.169	0.351 – 3.900	0.799
Intention	1.395	0.482 – 4.034	0.539
Education level (High school)	1.159	0.442 – 3.039	0.764
Education level (University)	6.636	1.954 – 22.532	0.002
Gender (Male)	0.349	0.130 – 0.935	0.036
Suicide history (Yes)	1.423	0.440 – 4.602	0.556
Age	0.959	0.917 – 1.004	0.073

Odds ratio (OR), Confidence interval (CI)

Baseline Characteristics and Clinical Findings in the Different Sexes and Age groups of Patients with Methadone Poisoning: A Registry-based Study



Abstract

Background

Methadone is a widely used synthetic opioid for managing severe pain and treating opioid use disorder. However, its misuse has led to significant cases of poisoning and related complications. The main aim of this study is to investigate baseline characteristics and clinical findings of methadone poisoning subjects in different sexes and age groups. We also use adjusted multiple regression to find predictors of ICU admission.

Method

This retrospective cross-sectional study was conducted at a referral poisoning center in central Iran. The study covered admissions from May 2023 to May 2024 retrieved from the data registry of a referral poisoning center in central Iran.

Results

463 patients were included. The study population predominantly consisted of males (79.2%) with a mean age of 41.7 ± 17.5 years. Men were older (P value < 0.001). Addiction history was present in 71.2% of patients, significantly higher among men and older age groups (P value < 0.001). Intentional poisoning was more common among females (P value = 0.033) and younger age groups (P value < 0.001). Women had higher incidences of nausea and vomiting (P value < 0.001) and abdominal pain (P value < 0.001). Eight

of the patients died eventually. The duration of hospitalization (P value = 0.011) and rate of ICU care on admission (P value = 0.016) were higher in men. Positive past medical history, intubation, age older than 65, and male sex were the statistically significant predictors of ICU admission in adjusted multiple logistic regression.

Key words

Methadone, Poisoning, Toxicity, Age, Sex, Opioids, Gender

Introduction

Opioids are still one of the frequently used medications in cancerous pain and severe non-cancerous pain management(1). Chronic use of opioids is associated with high risks of opioid use disorders(OU) (1). In most of the studies done on OU in chronic pain, the rates of misuse and addiction averaged between 21% to 29% and 8% to 12%, respectively(2). In the US, various policies have addressed this issue and OU has stabilized and slightly declined recently, but it's still a public health challenge (1,3,4). OU is estimated to affect 6.7 – 7.6 million US adults and adolescents(4). In Iran, opioids are the leading abused illicit drugs and the leading cause of drug dependency(5). Their 12-month drug abuse prevalence estimation in the general population is 0.28% (95% CI: 0.14-0.43)(5).

Methadone is a synthetic opioid that primarily stimulates mu-receptors(6). Methadone is a widely used opioid for severe pain management(7). It's also one of the common medications used in agonist maintenance therapy, which is the treatment of choice in OU(8). Although methadone is safer than many other opioids, its availability due to medical applications, made methadone abuse and poisoning one of the major health problems(9). Although death by other synthetic opioids has become more prevalent than methadone in the United States, methadone is still a common substance that causes hospitalization and death in some other countries, including Iran(10,11). In a registry-based study in Denmark, methadone was responsible for 71.4% of total deaths with drug overdose(12). A meta-analysis study estimated that the nonprescribed methadone use in the last year was 2.7% (95%CI: 0.9–5.4) and 0.1% (95%CI: 0.03–0.2), respectively, in men and women of Iran's general population(9). Methadone was responsible for 10.4% and 16.0% of acute poisonings in adults and children, respectively.

Many studies investigate the characteristics and clinical findings of patients hospitalized with methadone poisoning (13–21). In a survey of methadone hospitalized exposure based on the American College of Medical Toxicology's Toxicology Investigators Consortium case registry from 2010 to 2017, 60.2% of patients were male(19). The mean $\pm$ SD of age was 41.9 ± 16.6 . 79.5 % of subjects in this study were poisoned intentionally. Decreased levels of consciousness and respiratory depression were the most frequently observed clinical findings. In a study on the outcome of patients with methadone poisoning in Iran, the age was significantly different between recovered and deceased subjects(13). Most of the subjects were male, like in other studies, but sex had no significant effect on the outcome. All deceased subjects (42 patients) and 77.4 % of the included subjects (433 patients) had a positive addiction history. According to the National Drug Related Death Index in Ireland, 78% of patients who died from methadone poisoning in 2012 and 2013 were male(21). More than 40% of subjects were between 25 and 35 years old. 96.3% of subjects had a history of mental illness, and 15.9% of subjects had a recorded history of overdose.

To our knowledge, no comprehensive study has evaluated patients' primary clinical findings and baseline characteristics in different age groups and sexes. The primary aim of this article is to describe the baseline characteristics and clinical findings of patients hospitalized with a diagnosis of methadone poisoning and

evaluate the differences between different age groups and sexes. We also investigate the possible predictors of ICU admission in the primary evaluation of patients with methadone poisoning.

Method

Study design

This retrospective cross-sectional study was performed at the Poisoning Emergency of [BLINDED], the only poisoning referral center in [BLINDED], and the largest in [BLINDED]. The data was retrieved through the hospital data registry and records of patients admitted with methadone poisoning from 2023 May 5th to 2024 May 5th. The study protocol was approved by the institutional ethical committee (ethical code: IR.MUI.MED.REC.1400.097).

Inclusion criteria

The inclusion criteria were patients admitted to the toxicology emergency of [BLINDED] with self-report of methadone abuse or report of companions or relatives if the patient is unconscious. The final diagnosis is based on the opinion of a board-certified toxicologist. Patients who co-ingested other opioids with methadone or also had a diagnosis of other poisonings were excluded from the study.

Data collection

The following data was extracted: age, gender, history of addiction, type of addiction, history of psychiatric disorder, history of receiving psychiatric treatment, intention, criminal conviction record, self-harm history, marital status, educational level, level of consciousness, self-harm sign, heart auscultation, lung auscultation, nausea or vomiting, abdominal pain, plantar reflex, pupil size, pupillary light reflex, deep tendon reflex, vital signs, intubation or need for intubation on admission, need of ICU care on admission, length of hospitalization and outcome. Patients discharged from the hospital or moved to other wards with stable conditions are considered recovered. Patients who left the hospital with personal consent were excluded from the outcome analysis. All reported history and physical exam findings are based on the admission time.

Statistical analysis

The data was entered in Statistical Package for Social Sciences (SPSS) version 16. Descriptive analysis was performed for all variables in total, each sex, and each age group. Numerical variables were reported with mean $\pm$ standard deviation (SD) and categorical variables were reported by frequency and percentage. In the analytical step, the difference between genders and age groups was analyzed with the independent t-test for numerical and the chi-square test for categorical variables. Fisher's exact test was used instead of chi-square if more than 20% of cells had an expected value less than five in the cross-tab. Adjusted multiple logistic regression was used to find predictors of ICU admission. The odds ratio (OR) and 95 % confidence interval (CI) were used to show the effect size of variables in outcome prediction.

Results

Of the 789 patients admitted for methadone poisoning, 463 met the inclusion criteria for this study. Most of the patients were male (79.3%). The average age of the patients was 41.7 ± 17.5 years. Table 1 shows the epidemiological and taxological characteristics and past medical histories of the study population of each sex. Age, intention, criminal conviction, addiction history, type of addiction, and duration of hospitalization were significantly different between males and females. Men were older than women. Most of the subjects (60.8%) did not have diploma degrees. Most of the patients were poisoned intentionally in both sex groups. The intentional poisoning rate was significantly higher in women. The addiction rate and criminal conviction rate were higher in men. Opioids were the most abused substance in both sexes. Hospitalization duration was higher in men.

Table 2 presents epidemiological and taxological characteristics and past medical histories in different age groups. Gender, criminal conviction record, intention, addiction history, suicide history, and past medical history were statistically different between various age groups. Men were more prevalent in all age groups except patients younger than 20. The criminal conviction rate was highest in adults between 20 to 40 years old. Intentional poisoning was higher in younger subjects. The addiction rate was higher among older age groups. Suicide history was highest in patients younger than 20 years old. Past medical history was higher in older age groups.

Table 3 describes the initial clinical findings and outcomes of patients of each sex. Temperature, self-harm signs, nausea or vomiting, abdominal pain, receiving lavage and charcoal therapy, and ICU admission were statistically significantly different between males and females. Nausea or vomiting and abdominal pain were more common in women. Women were more likely to receive gastric lavage and activated charcoal therapy. ICU admission was higher for men. Eight of the patients died eventually. All of them were male, but the difference between males and females was not statistically significant (P value = 0.367).

Table 4 presents the clinical findings and outcomes of patients in each age group. Diastolic blood pressure, heart rate, abnormal lung auscultation, nausea or vomiting, ICU admission rate, and mortality were significantly different between different age groups. Diastolic blood pressure was lower among younger patients; however, systolic blood pressure was not significantly different between age groups. Heart rate was higher in younger patients. Abnormal lung auscultation was most frequent in patients over 65 years of age. Patients younger than 20 years old reported nausea or vomiting more frequently. They also received gastric lavage and active charcoal treatment more than the other groups. ICU admission rate and mortality were higher in older patients.

Adjusted multiple regression demonstrated that ICU admission was significantly associated with intubation, male sex, age group of more than 65 years, and presence of past medical history (Table 5). A history of past medical conditions increased the odds of ICU admission, with an odds ratio (OR) of 2.303 (95% CI: 1.061, 5.000). Intubation was the strongest predictor, with an OR of 75.599 (95% CI: 18.740, 304.971). Male gender was also associated with higher ICU admission odds than females (OR: 3.625, 95% CI: 1.039, 12.645). Individuals over 65 years had higher odds of ICU admission than patients younger than 20 (OR: 16.808, 95% CI: 1.304, 216.598), while other age groups did not show statistically significant associations.

Discussion

We performed a retrospective registry study to investigate the population characteristics in different age and sex groups in patients hospitalized with methadone poisoning. Our study showed that most of the patients admitted with methadone toxicity are men, which is similar to previous studies in Iran and other countries (17,19,22). This may be because methadone abuse is more prevalent among men and most of the

patients receiving methadone maintenance therapy are male (9,23,24). Also, in our study population, addiction history was higher for men. Adults between 40 to 65 years old had the highest prevalence compared to other age groups. Men were older in our study. Some previous research showed that men are significantly older in opioid-dependent subjects (25,26). In our study, 6.5% of subjects had college degrees, while in the latest national census in Iran, more than 12% of the general population had college degrees (27). This could hypothesize that academic education is a protective factor for methadone poisoning. Women were more likely to be poisoned intentionally. Previous studies have indicated that the suicide attempt rate is higher in women (28,29). Acting out suicide is a possible cause of intentional poisoning, especially in women (30). However, the subjects with Intentional methadone poisoning were mostly male, which is probably due to the greater availability of methadone among men. The intentional poisoning and past suicide history rates were both higher in younger age groups. Although the suicide rate is higher in older age groups in developed countries (31), the average age of suicide is younger in Iran(32). The prevalence of psychiatric disorders is estimated to be about 25% to 31% in Iran (33). As methadone poisoning is mostly a result of suicidal, self-harming, or risky behaviors, we expected a higher rate of psychiatric disorders in our study population. However, 19.5% of our study population had positive psychiatric disorders. This could be due to our study method limitation that only patients previously diagnosed with psychiatric disorders by a psychiatrist were identified and we did not identify possible psychiatric patients who were yet undiagnosed and had not visited a psychiatrist.

In our study, miosis was the most frequent abnormal clinical finding, followed by an abnormal level of consciousness. In another study conducted in Iran, the rate of miosis, comatose, and less severe impaired level of consciousness (GCS: 8-13) were 46.49, 19.74, and 44.93, respectively (14). Nausea and vomiting were higher in women and younger individuals. The reason behind this difference could be due to the higher rate of past abuse history in men and older subjects, resulting in tolerance to methadone. In a study about methadone poisoning in children, 69.0% of subjects presented with vomiting, making it the most frequent clinical finding after decreased level of consciousness and miosis (34). A higher incidence of psychosomatic disorders in women (35) suggests psychological factors could be a possible reason for higher nausea, vomiting, and abdominal pain in women.

In multiple adjusted regression, male gender, intubation, past medical history, and older age groups were associated with a higher risk of ICU care admission. Previous studies indicate that older age, intubation, and positive past medical history are associated with higher mortality (13,36). There was no significant association between male gender and outcome in previous studies (13,13,36,37). Methadone is metabolized predominantly by CYP2B6 and CYP3A4 in P450 cytochromes (38), which both have higher liver expression in women (39,40). There is no consensus on the effects of sex on the pharmacodynamics and pharmacokinetics of methadone(41). One study suggested that men could be more prone to QTc prolongation in patients receiving low doses (42). However, this finding is not consistent in the literature(43). One possible covariate resulting in higher ICU admission in men could be the dose of consumed methadone. Our registry database did not include the exact dose of ingested methadone and laboratory tests to report the serum concentration of methadone on admission. More studies are recommended for a better understanding of the effect of sex on the pharmacodynamics and pharmacokinetics of methadone and methadone toxicity outcome. Addiction history was significantly higher in deceased subjects compared to recovered ones in a previous study(13). However, we did not find addiction as a predictor for ICU admission.

Conclusion

We conducted a retrospective registry-based study on the baseline characteristics, clinical findings, and outcome of methadone poisoning in different age groups and sex groups. The risk of ICU admission and

mortality is higher in the older age groups. All of the 8 mortality subjects were male, yet the difference was statistically insignificant. Intubation, male gender, and presence of chronic disease in past medical history were predictors of ICU admission in multiple logistic regression. More studies with larger sample sizes and considering more covariates, such as dosage of ingested methadone and methadone serum level, are suggested to find the effect of sex on the pharmacodynamic, pharmacokinetic, risk of mortality, and risk of ICU admission in patients with methadone poisoning.

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Table 6 - evaluation of baseline, past medical, and epidemiologic characteristics in different sexes

		Female	Male	Total	P values
Patient count in each group		96	367	463	
Age		31.5 ± 17.5	44.3 ± 16.5	41.7 ± 17.5	<0.001
Marital status	Single	42 (44.2%)	141 (38.7%)	183 (39.9%)	0.104
	Married	47 (49.5%)	213 (58.5%)	260 (56.6%)	
	Divorced	5 (5.3%)	6 (1.6%)	11 (2.4%)	
	Widow	1 (1.1%)	4 (1.1%)	5 (1.1%)	
Educational level	Illiterate	8 (9.1%)	21 (6.4%)	29 (7.0%)	0.138
	Under diploma	39 (44.3%)	185 (56.4%)	224 (53.8%)	
	Diploma	32 (36.4%)	104 (31.7%)	136 (32.7%)	
	Collage education	9 (10.2%)	18 (5.5%)	27 (6.5%)	
Criminal conviction record	Positive	2 (2.1%)	37 (10.1%)	39 (8.4%)	0.012
	Negative	94 (97.9%)	330 (89.9%)	424 (91.6%)	
Route of exposure	oral	94 (98.9%)	364 (99.5%)	458 (99.3%)	0.240
	Multiple exposure	0 (0.0%)	2 (0.5%)	2 (0.4%)	
	Unknown	1 (1.1%)	0 (0.0%)	1 (0.2%)	
intention	Accidental	28 (29.5%)	155 (42.6%)	183 (39.9%)	0.033
	Induced	1 (1.1%)	9 (2.5%)	10 (2.2%)	
	Intentional	66 (69.5%)	200 (54.9%)	266 (58%)	
Addiction history	Addicted	38 (39.6%)	292 (79.6%)	330 (71.2%)	<0.001
	Not addicted	58 (63.4%)	75 (20.4%)	133 (28.2%)	
Type of addiction	Stimulants	0 (0.0%)	11 (3.8%)	11 (3.3%)	0.012
	Opioids	17 (44.7%)	113 (38.7%)	130 (39.4%)	
	Smoking	12 (31.6%)	33 (11.3%)	45 (13.6%)	
	Others ^a	2 (5.3%)	19 (6.5%)	21 (6.4%)	
	Polysubstance	7 (18.4%)	112 (38.4%)	119 (36.1%)	

	Unknown	0 (0.0%)	4 (1.4%)	4 (1.2%)	
Psychiatric disorder history	Positive	15 (15.6%)	74 (20.2%)	89 (19.2 %)	0.315
	Negative	81 (84.4%)	293 (79.8%)	374 (80.8%)	
Visiting psychiatrist	Yes	7 (7.3%)	48 (13.1%)	55 (11.9%)	0.119
	No	89 (92.7%)	319 (86.9%)	408 (88.1%)	
Suicide history	Positive	17 (17.7%)	42 (11.4%)	59 (12.7%)	0.101
	Negative	79 (82.3%)	325 (90.6%)	403 (81.3%)	
Self-harm history	Positive	6 (6.3%)	22 (6.0%)	28 (6.0%)	0.926
	Negative	90 (93.7%)	345 (94.0%)	425 (94.0%)	
Past medical history	Positive	20 (20.8%)	111 (30.2%)	131 (28.3%)	0.068
	Negative	76 (79.2%)	256 (69.8%)	332 (71.7%)	
Hospitalization duration (hours)		34.6 ± 30.0	57.4 ± 85.7	52.8 ± 78.2	0.011

The results are shown with frequency (percentage in the column group) for categorical variables and mean ± SD for numerical variables. ^a: addiction to any other substance not listed or any other drugs

Table 2 - evaluation of baseline, past medical, and epidemiologic characteristics in different age group

		<20 years	20 – 40 years	40 – 65 years	>65 years	P values
Patient count in each group		52	173	185	50	
gender	Male	23 (44.2%)	131 (75.7%)	169 (91.4%)	42 (84.0%)	<0.001
	Female	29 (55.8%)	42 (24.3%)	16 (8.6%)	8 (16.0%)	
Marital status	Single	50 (96.2%)	102 (60.0%)	28 (15.2%)	2 (4.0%)	-
	Married	2 (3.8%)	63 (37.1%)	147 (79.9%)	46 (92.0%)	
	Divorced	0 (0.0%)	5 (2.9%)	6 (3.3%)	0 (0.0%)	
	Widow	0 (0.0%)	0 (0.0%)	3 (1.6%)	2 (4.0%)	
	Illiteracy	4 (8.2%)	7 (4.3%)	13 (8.0%)	5 (12.2%)	-

Educational level	Under diploma	31 (63.3%)	72 (44.7%)	101 (62.3%)	20 (48.8%)	
	Diploma	12 (24.5%)	66 (41.0%)	41 (25.3%)	14 (34.1%)	
	Collage education	2 (4.1%)	16 (9.9%)	7 (4.3%)	2 (4.9%)	
Criminal conviction record	Positive	0 (0.0%)	23 (13.3%)	15 (8.1%)	1 (2.0%)	0.003
	Negative	52 (100.0%)	150 (86.7%)	170 (91.9%)	49 (98.0%)	
Rout exposure of	oral	50 (100.0%)	171 (98.8%)	184 (99.5%)	50 (100.0%)	0.877
	Multiple	0 (0.0%)	1 (0.6%)	1 (0.5%)	0 (0.0%)	
	Unknown	0 (0.0%)	1 (0.6%)	0 (0.0%)	0 (0.0%)	
intention	Accidental	15 (30.0%)	47 (27.3%)	90 (48.9%)	30 (60.0%)	<0.001
	Induced	0 (0.0%)	5 (2.9%)	4 (2.2%)	1 (2.0%)	
	Intentional	35 (70.0%)	120 (69.8%)	90 (48.9%)	19 (38.0%)	
Addiction history	Addicted	19 (36.5%)	120 (69.4%)	149 (80.5%)	40 (80.0%)	<0.001
	Not addicted	33 (63.5%)	53 (30.6%)	36 (19.5%)	10 (20.0%)	
Type of addiction	Stimulants	2 (10.5%)	7 (5.8%)	2 (1.3%)	0 (0.0%)	-
	Opioids	0 (0.0%)	36 (30.0%)	72 (48.3%)	22 (55.0%)	
	Smoking	9 (47.4%)	20 (16.7%)	14 (9.4%)	1 (2.5%)	
	Others ^a	0 (0.0%)	8 (6.7%)	10 (6.7%)	2 (5.0%)	
	Polysubstance	8 (42.1%)	48 (40.0%)	48 (32.2%)	15 (37.5%)	
	Unknown	0 (0.0%)	1 (0.8%)	3 (2.0%)	0 (0.0%)	
Psychiatric disorder history	Positive	6 (11.5%)	24 (24.3%)	39 (21.1%)	6 (12.0%)	0.095
	Negative	46 (88.5%)	131 (75.7%)	146 (78.9%)	44 (88.0%)	
Visiting psychiatrist	Yes	5 (9.6%)	23 (13.3%)	24 (13.0%)	3 (6.0%)	0.488
	No	47 (90.4%)	150 (86.7%)	161 (87.0%)	47 (94.0%)	
Suicide history	Positive	11 (21.2%)	29 (16.8%)	18 (9.7%)	1 (2.0%)	0.006
	Negative	41 (78.8%)	144 (83.2%)	167 (90.3%)	49 (98.0%)	
	Positive	4 (7.7%)	19 (11.0%)	5 (2.7%)	0 (0.0%)	0.002

Self-harm history	Negative	48 (92.3%)	154 (89.0%)	180 (97.3%)	50 (100.0%)	
Past medical history	Positive	11(21.2%)	19 (11.0%)	73 (39.5%)	28 (56.0%)	<0.001
	Negative	41 (78.8%)	154 (89.0%)	112 (60.5%)	22 (44.0%)	

The results are shown with frequency (percentage in the column group) for categorical variables and mean $\pm$ SD for numerical variables. ^a: addiction to any other substance not listed or any other drugs *: statically significant

Table 3 - evaluation of clinical findings on admission and outcome in different sexes

		Female	Male	Total	P values
Systolic blood pressure		120.0 $\pm$ 15.1	122.7 $\pm$ 20.4	122.1 $\pm$ 19.5	0.236
Diastolic blood pressure		75.9 $\pm$ 10.2	77.2 $\pm$ 13.5	77.0 $\pm$ 12.9	0.358
Temperature		36.88 $\pm$ 0.28	36.97 $\pm$ 0.35	36.95 $\pm$ 0.34	0.035
Heart rate		88.7 $\pm$ 16.0	92.1 $\pm$ 18.5	91.4 $\pm$ 18.0	0.092
Respiratory rate		15.5 $\pm$ 4.3	16.5 $\pm$ 5.9	16.3 $\pm$ 5.6	0.113
Level of consciousness	Awake	73 (76%)	261 (71.1%)	334 (72.1%)	0.366
	Confused	6 (6.3%)	29 (7.9%)	35 (7.6%)	
	Lethargic	7 (7.3%)	34 (9.3%)	41 (8.9%)	
	Obtundation	5 (5.2%)	12 (3.3%)	17 (3.7%)	
	Stuporous	2 (2.1%)	25 (6.8%)	27 (5.8%)	
	Comatose	3 (3.1%)	6 (1.6%)	9 (1.9%)	
heart auscultation	Abnormal	10 (10.4%)	32 (8.7%)	42 (9.1%)	0.606
	Normal	86 (89.6%)	335 (91.3%)	441 (90.1%)	
lung auscultation	Abnormal	2 (2.1%)	26 (7.1%)	28 (6.0%)	0.067
	normal	94 (97.9%)	341 (92.9%)	435 (94.0%)	
Nausea or vomiting	Positive	28 (29.2%)	40 (10.9%)	68 (14.7%)	<0.001
	Negative	68 (70.8%)	327 (89.1%)	395 (85.3%)	
Abdominal pain	Positive	8 (8.3%)	6 (1.6%)	14 (3.0%)	<0.001
	Negative	88 (91.7%)	361 (98.4%)	449 (7.0%)	

Pupil's size	Normal	44 (46.8%)	152 (42.5%)	196 (43.4%)	0.438
	Miosis	45 (47.9%)	194 (54.2%)	239 (52.9%)	
	Mydriasis	5 (5.3%)	12 (3.4%)	17 (3.8%)	
Pupillary light reflex	Positive	94 (97.9%)	365 (99.5 %)	459 (99.1%)	0.192
	Negative	2 (2.1%)	2 (0.5%)	4 (0.9%)	
Deep tendon reflex	Normal	95 (99.0%)	362 (98.6%)	457 (98.7%)	1.000
	Decreased	1 (1.0%)	5 (1.4%)	6 (1.3%)	
Plantar reflex	Extension	0 (0.0%)	8 (2.2%)	8 (1.7%)	0.293
	No response	5 (5.2%)	14 (3.8 %)	19 (4.1 %)	
	Flexion	91 (94.8%)	345 (94%)	436 (94.2%)	
Gastric lavage	Received	18 (19.4%)	25 (7.0%)	43 (9.5%)	<0.001
	Did not received	75 (80.6%)	333 (93.0%)	408 (90.5%)	
Active charcoal	Received	32 (34.4%)	78 (21.8%)	110 (24.4%)	0.012
	Did not received	61 (65.6%)	280 (78.2%)	341 (75.6%)	
Intubation on admission	Positive	2 (2.1 %)	19 (5.2%)	21 (4.5%)	0.195
	Negative	94 (97.9%)	348 (94.8%)	442 (95.5%)	
ICU care on admission	Positive	4 (4.2%)	47 (12.8%)	51 (11.0%)	0.016
	Negative	92 (95.9%)	320 (87.2%)	412 (99.0%)	
Outcome	Recovery	86 (100.0%)	334 (97.7%)	420 (98.1%)	0.367
	Mortality	0 (0.0%)	8 (2.3%)	8 (1.9%)	

The results are shown with frequency (percentage in the column group) for categorical variables and mean $\pm$ SD for numerical variables. *: statically significant

Table 4 -evaluation of clinical findings on admission and outcome in different age groups

		<20 years	20 – 40 years	40 – 65 years	>65 years	P values
Systolic blood pressure		118.0 ± 19.7	122.7 ± 17.4	122.6 ± 20.5	124.7 ± 23.1	0.153
Diastolic blood pressure		72.8 ± 11.6	77.7 ± 12.1	77.5 ± 14.7	76.2 ± 14.5	0.029
Temperature		36.91 ± 0.27	36.95 ± 0.27	36.95 ± 0.41	37.02 ± 0.27	0.356
Heart rate		97.1 ± 16.3	93.7 ± 18.0	89.1 ± 18.8	89.3 ± 19.0	<0.001
Respiratory rate		18.2 ± 10.6	16.1 ± 3.4	17.4 ± 9.6	16.9 ± 7.8	0.070
Level of consciousness	Normal	45 (86.5%)	125 (72.3%)	132 (71.4%)	31 (62.0%)	-
	Confusion	2 (1.9%)	11 (6.4%)	16 (8.6%)	6 (12.0%)	
	lethargy	3 (5.8%)	15 (8.7%)	14 (7.6%)	8 (16.0%)	
	Obtundation	1 (1.9%)	6 (3.5%)	8 (4.3%)	2 (4.0%)	
	Stupor	2 (3.8%)	10 (5.8%)	13 (7.0%)	2 (4.0%)	
	Coma	0 (0.0%)	6 (3.5%)	2 (1.1%)	1 (2.0%)	
heart auscultation	Abnormal	6 (11.5%)	19 (11.0%)	10 (5.6%)	7 (14.0%)	0.133
	Normal	46 (88.5%)	154 (89.0%)	175 (94.4%)	43 (86.0%)	
lung auscultation	Abnormal	4 (7.7%)	5(2.9%)	12 (6.5%)	7 (14.0%)	0.026
	normal	48 (92.3%)	168 (97.1%)	173 (93.5%)	43 (86.0%)	
Nausea or vomiting	Positive	15 (28.8%)	22 (12.7%)	27 (14.6%)	4 (8.0%)	0.014
	Negative	37 (71.2%)	151 (87.3%)	158 (85.4%)	46 (92.0%)	
Abdominal pain	Positive	5 (9.6%)	3 (1.7%)	5 (2.7%)	1 (2.0%)	0.057
	Negative	47 (90.4%)	170 (98.3%)	180 (97.3%)	49 (98.0%)	
Pupil's size	Normal	22 (42.3%)	66 (39.1%)	82 (45.8%)	25 (51.0%)	0.729
	Miosis	28 (53.8%)	97 (57.4%)	89 (49.7%)	23 (46.9%)	
	Mydriasis	2 (3.8%)	6 (3.6%)	8 (4.5%)	1 (2.0%)	
Pupillary light reflex	Positive	52 (100.0%)	170 (98.3%)	185 (100.0%)	49 (98.0%)	0.165
	Negative	0 (0.0%)	3 (1.7%)	0 (0.0%)	1 (2.0%)	
Deep tendon reflex	Normal	52 (100.0%)	171 (98.8%)	182 (98.4%)	49 (98.0%)	0.789
	Decreased	0 (0.0%)	2 (1.2%)	3 (1.6%)	1 (2.0%)	

Plantar reflex	Extension	0 (0.0%)	2 (1.2%)	6 (3.2%)	0 (0.0%)	0.344
	No response	2 (3.8%)	7 (4.0%)	6 (3.2%)	4 (8.0%)	
	Flexion	50 (96.2%)	164 (94.8%)	173 (93.5%)	46 (92.0%)	
Gastric lavage	Received	14 (27.5%)	21 (12.5%)	4 (2.2%)	4 (8.7%)	<0.001
	Didn't received	37 (72.5%)	147 (87.5%)	179 (97.8%)	42 (91.3%)	
Active charcoal	Received	21 (41.2%)	50 (29.8%)	27 (14.8%)	11 (23.9%)	<0.001
	Didn't received	30 (58.8%)	118 (70.2%)	156 (85.2%)	35 (76.1%)	
Intubation on admission	Positive	1 (1.9%)	6 (3.5%)	9 (4.9%)	5 (10.0%)	0.192
	Negative	51 (98.1%)	167 (96.5%)	176 (95.1%)	45 (90.0%)	
ICU care on admission	Positive	1 (1.9%)	17 (9.8%)	21 (11.4%)	12 (24.0%)	0.004
	Negative	51 (98.1%)	156 (90.2%)	164 (88.6%)	38 (76.0%)	
Out-come	Recovery	44 (100.0%)	163 (100.0%)	172 (98.9%)	39 (86.7%)	<0.001
	mortality	0 (0.0%)	0 (0.0%)	2 (1.1%)	6 (13.3%)	

The results are shown with frequency (percentage in the column group) for categorical variables and mean $\pm$ SD for numerical variables. *: statically significant

Table 5 - Multiple regression for prediction of ICU admission

		Odds ratio (95% confidence interval)	P value
Addiction history		0.460 (0.201, 0.1053)	0.066
Past medical history		2.303 (1.061, 5.000)	0.035
Intubation		75.599 (18.740, 304.971)	<0.001
Gender	Male	3.625 (1.039, 12.645)	0.043
	Female (1)	-	
Age group	> 65 years	16.808 (1.304, 216.598)	0.030
	45- 65 years	7.591 (0.639, 90.157)	0.108
	20 -45 years	9.327 (0.763, 114.058)	0.080
	< 20 years (1)	-	

Reference groups are shown with "(1)"

Toxicoepidemiology and Outcomes of Acute Poisoning in Patients With and Without Substance Use Disorders: A Retrospective Registry-Based Study

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Abstract

Introduction: We aimed to investigate the epidemiological and clinical characteristics of acute poisoning in patients with and without a history of SUD.

Methods: Retrospective registry study, all hospitalized poisoning cases in one year were classified by SUD history. Data on demographics, toxicological characteristics, clinical presentation, and patient outcomes were collected.

Results: Of 4,292 analyzed patients, 1,815 (42.3%) reported a history of SUD. Among those with SUD, the most common dependencies were cigarette smoking (544/1,815; 30.0%), opioids (346/1,815; 19.1%), alcohol (86/1,815; 4.7%), stimulants (73/1,815; 4.0%), and multiple substance dependency (646/1,815; 35.6%). Patients with SUD differed significantly from those without SUD in age, sex, marital status, education, agent category, route and intent of exposure, comorbidity, psychiatric history, prior suicide and self-harm, and criminal conviction history. The length of stay and in-hospital mortality were higher in patients with SUD (both $p < 0.05$). Opioid use disorder patients (OUD) were characterized by older age, higher rates of accidental poisoning, lower education levels, and were mostly married. The median (IQR) duration of hospitalization was higher among patients with a history of OUD (opioid use disorder). Overall mortality was 0.9% (33/4,292) and was highest in the OUD subgroup ($n = 8$, 2.6%). In multivariable analysis, SUD was associated with increased odds of in-hospital mortality (adjusted odds ratio [aOR] = 2.13, 95% CI: 1.06–4.30; $p = 0.034$).

Conclusions: Poisoning profiles and outcomes differed by SUD status, supporting routine SUD screening during poisoning admissions, safe-medication counseling for patients without SUD, and targeted opioid risk-mitigation for patients with SUD.

Keywords: Dependency, Acute poisoning, Substance use disorders

Introduction

Substance use disorders (SUDs) are highly prevalent and contribute substantially to preventable morbidity, mortality, and socioeconomic burden worldwide [1,2]. According to the World Drug Report 2023, more than 296 million individuals globally consumed drugs in 2021 [3]. The 2019 Global Burden of Disease, Injuries, and Risk Factors Study (GBD) identifies drug use disorders as one of the top 20 contributors to Disability-Adjusted Life Years (DALYs) among individuals aged 10–49 [3,4]. Over 2 billion people consume alcohol worldwide [5]. According to the WHO report, over 200 million people live with alcohol use disorder [6,7]. Globally, the age-standardized prevalence rates for amphetamine and cocaine dependency were 96 per 100,000 population and 64 per 100,000 population, respectively [8]. Alcohol is among the contributing factors to premature death and disability [5]. Stimulant use disorder contributes to the rising number of stimulant-related deaths [9]. In a systematic review and meta-analysis study, individuals who use illicit opioids face up to a 15-fold higher risk of premature mortality compared to the general population[10].

SUD and related harm are also major public health problems in developing countries like Iran[10]1. There is a long history of opium use and its derivatives in Iran, making them among the most common illicit drugs consumed in this country[2,11]. The third study of rapid assessment of substance abuse in Iran showed that there are 1.2 million opium and other opiate users in this country[12]. While traditional drugs of abuse in Iran have been opium and cannabis, there has been an increase in the use of heroin, crystal methamphetamine, and ecstasy [11].

Acute poisoning frequently co-occurs with substance use, and clinical guidelines emphasize assessing SUD history in patients presenting with self-poisoning[13,14]. Previous studies suggest that poisoning could be a common method of suicide among heroin user[15]. Moreover, substance use disorder was reported as a key risk factor for unintentional poisoning[14]. Besides, death from accidental overdose was found to be associated with substance use disorder[16]. Analysis of overdose decedents suggests that a history of substance use is common among this group of patients[17,18].

Acute poisoning is in itself associated with a serious prognosis, especially when related to substance use[13,19-21]. Follow-up studies of mortality among drug addicts showed that the major causes of death are suicides and accidental drug overdoses[22].

Few studies have compared acute poisoning in patients with SUD vs patients without SUD[13,14,23]. However, these studies only focused on limited variables[23] and did not analyze results by subgroup, such as specific types of SUD like opioids, only focused on a special type of poisoning, e.g., accidental overdose[14], or did not assess the primary substances involved in poisoning among this group of patients[13].

We therefore compared toxicoepidemiology and in-hospital outcomes in patients with acute poisoning, stratified by SUD history, and tested whether SUD was associated with mortality. We hypothesize that a pre-existing history of SUD is associated with increased adverse outcomes in patients hospitalized with acute poisoning. Hence, our study will provide a better picture of toxic agents and outcomes among this group of patients.

1. Method

2.1 Study Design and Setting

We conducted a retrospective registry-based study at Khorshid Hospital, a tertiary referral center for poisoning affiliated with Isfahan University of Medical Sciences (Isfahan, Iran). This hospital is a teaching tertiary hospital in Isfahan, Iran, serving local residents and out-of-state referrals, and is one of the largest hospitals with a toxicology center in central Iran. Data were extracted from the data registry system [24].

This study was conducted in accordance with the principles of the Declaration of Helsinki. It was approved by the Ethics Committee of the Review Board at Isfahan University of Medical Sciences under the code IR.MUI.MED.REC.1402.442. Written informed consent was obtained from all participants (or their surrogates). The criteria for obtaining informed consent included the following: (1) disclosure of comprehensive information, (2) assessment of the patient's (or surrogate's) competency, and (3) assurance of voluntary consent. To uphold patient confidentiality, all records were securely stored in password-protected files.

2.2 Participants

All consecutive patients presented at KHPEC with acute poisoning from May 5, 2023, to May 5, 2024, who had a record of hospitalization in the emergency room, department, or intensive care unit of KHPEC were included in our study. Patients discharged against medical advice (AMA)/with personal consent were excluded from all analyses. If available, missing information in the registration form was gathered from the hospital's archived medical records. Acute exposure to a substance in assumed toxic amounts leading to hospital admission was considered acute poisoning. Diagnoses of poisoning and toxic agents were made by the attending physician treating the patient, based on all available information, including the patient's history, clinical evaluation, and toxicology blood or urine tests, where necessary.

SUD history was defined by patient report and categorized as cigarette smoking, stimulants, alcohol, opioids, other specified drugs, or multiple substance dependency (≥ 2 categories). Patients with unidentified or unknown SUD were categorized under the "other" SUD group.

We first divided patients into two groups according to self-reported SUD: 1) patients with SUD, 2) patients without SUD. Further, patients were categorized into three groups: (1) patients with history of opioid use disorder (e.g., opium, heroin, methadone), (2) patients with a history of non-opioid use disorder (including alcohol, stimulants, tobacco, multiple-substance use, and other non-opioid substances), and (3) patients without a self-reported SUD.

1.3 Data collection

For each case, the following data were collected using the KHPEC data registration system: demographic information (age, gender), type of poisoning (pharmaceutical agents (prescription or over-the-counter), opioids, stimulants, alcohol, pesticides, household chemicals, hydrocarbons, gases/heavy metals, bites/stings, other, and multi-substance (≥ 2 agent categories)). Multiple substance poisoning was defined as the ingestion of two or more types of substances (including Pharmaceutical agents, opioids, stimulants, alcohol, pesticides, bites, household chemicals, gas/heavy metals, and hydrocarbons).

Other variables included self-reported SUD, type of addictive substance, route of exposure (oral, dermal, inhalation, parenteral, multiple exposures, and unknown), route of poisoning (accidental, induced by others, intentional), previous episodes of suicide, self-harm history, criminal record history, clinical manifestations on admission (including vital signs, mental status, respiratory, cardiac, gastrointestinal and general physical examination), duration of hospitalization, endotracheal intubation and outcome (in-hospital mortality or recovery). All variables were collected systematically for all patients. Data is abstracted solely from the registry through automated extraction. As this retrospective study may be prone to selection and information bias, independent data abstraction by multiple reviewers or double-checking for errors was performed.

1.4 Statistical analysis

Data were analyzed using version 26 of the Statistical Package for Social Sciences (SPSS Inc., Chicago, IL, USA). We used t-tests or ANOVA for normally distributed continuous variables, and the Mann–Whitney U test or Kruskal–Wallis test otherwise. For continuous variables, median with IQR (Interquartile range (first-third quartile) for non-normally distributed data were reported. Continuous data were expressed as medians with interquartile ranges (IQRs), whereas categorical data were presented as numbers (n) and/or percentages (%). The normality of continuous variables was assessed using the Kolmogorov-Smirnov test and Q-Q plot. Chi-square independent/Fisher's exact test was used to compare categorical variables between HA and NHA. Independent samples t-tests or Mann-Whitney nonparametric tests were used to compare normally and non-normally distributed continuous variables between HA and NHA, respectively. We modeled in-hospital mortality using logistic regression. Prespecified covariates included age, sex, intent (suicidal/accidental/induced), agent category, psychiatric history, and comorbidity. Results are reported as adjusted odds ratios (aORs) with 95% CIs. For binary logistic regression, we considered two groups: patients with no SUD history (0), patients with a history of opioid use disorder (OUD), and patients with a history of other types of SUD in one group (1). The P value less than 0.05 was considered statistically significant.

Cliff's Delta effect size coefficients and confidence intervals were calculated as the effect size. Effect sizes were reported as odds ratios for logistic regression and Glass' Δ , the standardized mean difference *for the t-test*. Effect sizes (Glass' Δ) were calculated with corresponding 95% CIs (https://www.psychometrica.de/effect_size.html)

2. Results

During the one-year study period, 4297 patients met the inclusion criteria. Five patients were excluded from the study; therefore, the data regarding the 4292 patients were evaluated. Of these patients, 42.2% (n = 1,815) had a history of SUD. The main types of SUD observed were, cigarette smoking (N=544, 30%), opioids (N=346, 19.1%), alcohol (n=86, 4.7%), stimulants (n=73, 4%),

drugs (n=6, 0.1%) others (n=114, 2.7%) and 646 had problems with more than one of these (35.6%).

Table 1 presents the demographic and toxicological characteristics of patients according to their history of SUD. Among patients with SUD, pharmaceutical poisoning accounted for the largest proportion of cases (29.4%), followed by opioids (29.3%), multiple-substance poisonings (21.3%), alcohol (6.7%), and pesticides (3.8%). Pharmaceutical poisoning was also the most frequent type of poisoning among patients without SUD, occurring at approximately twice the rate (60.9%), followed by opioids (10.6%), multiple-substance poisonings (7.7%), and pesticides (5.8%).

Patients with SUD were significantly older than those without SUD (mean [SD] age 36.60 [15.03] vs 30.48 [14.40] years; $p < 0.001$). The standardized mean difference was small (Glass' $\Delta = 0.42$, 95% CI 0.35–0.47). Most patients with SUD were men ($n = 1,390$; 76.6%).

In contrast, most patients without SUD were female ($n = 1,625$, 65.6%). By age group, more than half of poisonings among patients with SUD occurred between 20 and 40 years ($n = 985$, 54.4%; $p < 0.001$). There was a statistically significant difference between the two groups in terms of marital status, level of education, and route of poisoning ($P < 0.05$). The intent was most often suspected suicide (72.8% in patients with SUD vs. 82.5% in those without SUD), followed by accidental poisoning (25.5% vs. 16.3%, respectively) in both groups.

The median (IQR) duration of hospitalization was significantly higher among patients with a history of SUD (19 [12–38] hours vs. 17 [11–28] hours, $p < 0.001$, Mann–Whitney U test). However, the nonparametric effect size was Cliff's delta = 0.102, indicating a negligible magnitude of difference. Patients with SUD also had higher rates of past medical illness, psychiatric disorders, previous suicide attempts, and self-harm ($p < 0.001$). Among these patients, pharmaceutical agents were the most frequently reported substances involved in suicide attempts (data not shown). Criminal conviction history was more than 8-fold more common in SUD than in non-SUD ($p < 0.001$).

Table 2 presents admission findings and outcomes by SUD status. Systolic blood pressure differed slightly between groups ($p=0.030$); other vital signs did not differ significantly. The proportion requiring endotracheal intubation was numerically higher in SUD (5.1% vs 3.9%; $p \approx 0.06$). In-hospital mortality was higher in SUD (20/1,815; 1.1%) than in non-SUD (13/2,477; 0.5%); this difference was statistically significant (Fisher's exact $p \approx 0.035$; unadjusted OR ≈ 2.11). In the SUD-positive group, 20 patients died during hospitalization (19 male, one female).

A total of 346 patients had a history of OUD, with the majority addicted to opium, followed by methadone, multiple types of opioids, and heroin. The demographic and toxicological characteristics of patients based on their history of OUD, other SUD, or nonOUD are presented in Table 3. There was a significant difference in terms of age, gender, marital status, education level, types of poisoning, route of exposure, past medical history, history of psychiatric disease, suicide, self-harm, and criminal record history between the three groups ($P < 0.001$). The most common type of poisoning among patients with a history of OUD was opioid poisoning, followed by multiple substances, pharmaceutical agents, and pesticides. These patients also generally were older, had a higher proportion of accidental poisoning, had lower education levels, underlying diseases, and a history of criminal conviction compared to other groups, and were mostly married. A lower proportion of suicides was also observed among these patients compared to other groups.

Table 4 shows clinical findings and outcomes across the three groups. Median LOS was longest in opioid SUD (~22 [13–50] h), intermediate in non-opioid SUD (~19 [12–36] h), and lowest in no SUD (~17 [11–28] h) (pairwise comparisons generally $p \leq 0.001$). Mortality differed across groups (opioid SUD 2.6%, non-opioid SUD 0.9%, no SUD 0.6%; χ^2 $p \approx 0.001$). Abnormal lung examination was more frequent in opioid SUD, while nausea/vomiting was least frequent in opioid SUD (both $p < 0.001$). Across groups, SBP ($p \approx 0.050$) and respiratory rate ($p \approx 0.042$) showed modest differences; other vital signs did not.

A binary backward stepwise logistic regression analysis was performed to ascertain the effect of SUD history on outcome. There was a significant association between SUD history and mortality (OR = 2.13, 95% CI (1.06–4.30); $P = 0.034$), consistent with the unadjusted estimate.

Univariable (unadjusted) logistic regression analysis revealed the following independent factors associated with a history of SUD. Males were significantly more likely to have an SUD history compared with females (OR = 4.89, 95% CI = 4.11–5.82). Relative to university education, both under-diploma and diploma levels were associated with higher odds (OR = 1.68; 95% CI, 1.23–2.19 and OR = 1.57; 95% CI, 1.21–2.02, respectively). Compared with patients aged <20 years, the odds of SUD were higher in those aged 20–40 (OR = 2.30; 95% CI, 1.81–2.93), 41–65 (OR = 2.95; 95% CI, 2.17–4.00), and ≥ 65 (OR = 2.54; 95% CI, 1.57–4.09). SUD history was also associated with past medical illness, self-harm, criminal conviction, prior suicide attempt, psychiatric disease, and poisoning type (all $p < 0.05$; Table 5).

3. Discussion

SUD remains a major public health challenge globally[25]. There is, however, limited information in the existing literature regarding the characteristics of these patients, particularly the primary toxic agents consumed by this group in cases of acute poisoning. Therefore, this study addresses this research gap in a retrospective registry-based study in a referral poisoning center. Because the likelihood of overdose may vary by the type of addiction[26] and given the high prevalence of opium misuse in Iran[27], we conducted analyses for subgroups of opioid addict patients. Thus, this study helps to address the paucity of data on the course of patients with opioid SUD when hospitalized for acute poisoning. An important strength of our study is its large sample size, specifically focusing on patients with a history of SUD.

Our findings showed that a history of SUD was independently associated with higher mortality and significantly longer hospital stay in cases of acute poisoning. Our findings are consistent with a previous ICU-based study conducted in eastern Iran (Birjand), in which opioids and pesticides were also the most common causes of poisoning, and the mortality rate approached 20% [28]. While we report a lower mortality rate than in our cohort, the repeated importance of opioids shows they remain critically important in poisoning-related mortality in Iran.

Previous studies identified SUD as a risk factor for fatal and non-fatal overdose among special subpopulation[16,26,29]. Bohnert et al.[16] reported SUD as a risk factor for accidental overdose death due to medications, alcohol, or illegal drugs among veterans. Gaella et al.[26], in a study on 1,066 illicit drug users, identified that severe cocaine dependency was associated with higher odds of experiencing overdose in the past year (OR = 1.6). Cox et al.[29], in a study on women of reproductive age hospitalized for poisoning, reported that substance abuse was strikingly high among this group of patients. Jacobse et al.[23], in a study on 1047 patients in Oslo, reported that

mortality among females was significantly higher in substance abusers compared to non-abusers. In contrast, no such difference was observed among males. A 20-year follow-up study conducted in Norway, beginning in 1980, on patients discharged after treatment for self-poisoning identified substance abuse as an independent predictor of mortality. (HR for opioid addict=2, alcohol abuse=1.6, drug abuse=1.7)[13]. Causality cannot be inferred from this retrospective study; however, several mechanisms may explain the association. Chronic usage of tobacco, alcohol, and other drugs is associated with cardiovascular, pulmonary, and metabolic diseases[۳۰]. Moreover, the health effects of substance use disorder are increased in critically ill adult patients, as a history of substance use disorder can affect a patient's outcome [30]. These findings support routine SUD screening during poisoning admissions and linkage to evidence-based treatment.

Our findings revealed significant differences in toxicoepidemiological characteristics between patients with and without SUD. However, physical examination on admission showed no major differences between the groups, except for level of consciousness and systolic blood pressure. Distinct patterns in poisoning types were observed: while pharmaceutical poisoning was the most common type in both groups, its proportion was nearly twice as high among patients without SUD compared to those with SUD. In contrast, opioid and multiple-substance poisonings were approximately three times more frequent in patients with SUD than in those without SUD.

Alcohol and pesticide poisoning were also notably observed in PHA. Yoon et al., in a study on nationally representative hospital data in the USA, identified SUD as an important risk factor for drug and alcohol poisoning[14]. Their research further indicated that[14] patients with drug dependency were generally more likely to have unintentional poisoning from specific drugs (e.g., tranquilizers, antidepressants, sedatives, and hypnotics) than from other drugs. Considering the high prevalence of opioid misuse in Iran[27], it seems reasonable that opioids, as a commonly misused drug, could be among the primary agents responsible for acute poisoning. In a previous study conducted at the same hospital, SUD was found to be prevalent among patients with pesticide poisoning [31]. The relationship between illicit drug use and overdose risk may vary by substance type and stage of use [26]. Therefore, additional research is needed to evaluate the impact of specific categories of SUD on poisoning outcomes.

A pronounced gender disparity was observed in this study: patients with SUD were predominantly male, whereas those without SUD were mostly female. This aligns with global epidemiological trends in substance use disorders [32].

The results indicate a significant association between a history of suicide and SUD. Additionally, the majority of patients with SUD had suicidal intent; however, compared to patients without SUD, a higher proportion of SUD cases resulted from accidental poisoning. This higher rate of accidental poisoning among patients with SUD may be due to substance abusers often using drugs and alcohol as a coping mechanism rather than with suicidal intent[23]. Previous studies showed that suicide attempts and suicides occur more frequently among chronic alcohol consumers[33] and heroin users[15]. The main toxic agent involved in suicide attempts among SUD cases was pharmaceutical agents. Intriguingly, drugs do not appear to be the method of choice for drug users attempting suicide. However, assessing intent in patients presenting with self-poisoning at the emergency department can be challenging. The patients are often unwilling to report the use of illicit drugs, and even the ambivalence and their desire to die can complicate the evaluation[13,34].

Our findings revealed an association between past medical history and SUD. The link between illicit drug use and certain medical conditions has been previously established[35,36]. The association between crime [37,38] and past psychiatric disease[39,40] with drug misuse has been mentioned in the existing literature and was also observed in our study among patients with acute poisoning.

In this study, we also addressed opioid SUD. The majority are addicted to opium, followed by methadone, multiple types of opioids, and heroin. Opioids, multiple substances, drugs, and pesticides accounted for the majority of acute poisoning cases. In contrast to Jacobse et al.[23] in our study, opioid misuse was more common in individuals who died of acute poisoning. Opioid use disorder is associated with elevated morbidity, mortality, and other adverse health and social conditions[41]. A previous study showed that the mortality rate among opioid users was 6.9 times greater than that of the general population[42].

Abnormal respiratory examinations, mean duration of hospitalization, and in-hospital mortality were significantly higher among patients with a history of opioid SUD. Previous research revealed that opioid-tolerant populations have a longer length of stay in the hospital and are at risk of poorer outcomes and higher healthcare costs associated with their care[43].

Our study had several limitations. First, one limitation was the inclusion criteria for the history of SUD. The retrospective design and reliance on self-reported history of SUD may have introduced recall bias and misclassification bias.

Second, although our center serves as the province's primary referral center for poisoning cases, the study was limited to data from a single poisoning center, which may reduce the generalizability of the findings to other settings or populations (single-center bias). Furthermore, the retrospective design potentially increases the risk of selection and information bias. While we adjusted for several demographic variables, unmeasured confounding factors, such as socioeconomic status and specific substances used, may have influenced the results. Another limitation of our study was the lack of detailed stratification by opioid subtype (e.g., prescription opioids, and non-prescription opioids). Since these categories may have distinct profiles and outcomes, future research is recommended to clarify these differences. Our results should be interpreted with caution given the low mortality rate. Additional predictors may also contribute to the odds of mortality but could not be reliably assessed within the constraints of our dataset. We therefore recommend that future investigations with larger sample sizes and higher numbers of outcome events further validate our findings.

Conclusion

This study, conducted at a referral poisoning center in Iran, examined the toxicoepidemiological characteristics and outcomes of patients with acute poisoning, comparing those with and without a history of SUD. SUD was present in ~42% of poisoning admissions, commonly multiple substance, cigarette smoking, and opioids. Key demographic differences were found, with patients having a SUD history being significantly older and predominantly male, while those without such a history were more often female. Although pharmaceutical poisoning was the most frequent type across all groups, patients with SUD, particularly opioid SUD, were significantly more likely to experience poisoning related to their substance of misuse, including opioid and multi-substance poisonings.

Critically, this study demonstrated that patients with a history of SUD experienced poorer clinical outcomes, including a significantly higher in-hospital mortality rate, longer hospital stays, and increased need for mechanical ventilation. Notably, opioid-addicted patients presented with distinct characteristics, including older age, a higher proportion of accidental poisonings, and a higher proportion of lower educational levels compared to other groups.

These observed differences in poisoning profiles highlight the importance of tailored prevention and intervention strategies for each patient group. For patients without SUD, strategies should emphasize safe medication practices and patient education to prevent unintentional overdoses. In contrast, for patients with SUD, interventions should prioritize addressing opioid misuse, managing multiple substance use, and mitigating risks associated with alcohol and pesticide exposure. Improved screening for SUD in cases of acute poisoning admissions, as well as educational programs for healthcare professionals, are recommended. Further prospective studies or multi-center studies are needed to validate these findings and explore socioeconomic mediators.

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Declaration of Interest:

The authors declare that they have no conflict of interest.

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Data availability statement

De-identified data are available from the corresponding author upon reasonable request and ethics approval.

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Declaration of generative AI use

No AI tools nor technologies were used for this publication.

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Table 7. Demographic, exposure, and history characteristics by substance use disorder (SUD) status

Variables		Total	History of SUD N=1815	No history of SUD N= 2477	P-value
Age	Mean (SD) Median (IQR)	33.06 (14.98)	36.60 (15.03) 34(20)	30.48 (14.40) 28(19)	<0.001
Age (year)	<20	858 (20.1%)	209 (11.5%)	649 (26.3%)	<0.001
	20-40	2297 (53.7%)	985 (54.4%)	1312 (53.2%)	
	41-65	940 (22.0%)	517 (28.6%)	423 (17.2%)	
	>=65	181 (4.2%)	99 (5.5%)	82 (3.3%)	
	No data available		5	11	
Gender	Female	2050 (47.8%)	425 (23.4%)	1625 (65.6%)	<0.001
	Male	2242 (52.2%)	1390 (76.6%)	852 (34.4%)	
Marital status	Single	2170 (51.2%)	912 (50.9%)	1258 (51.4%)	0.012
	Married	1970 (46.5%)	823 (45.9%)	1147 (46.9%)	
	Divorced	82 (1.9%)	49 (2.7%)	33 (1.3%)	
	Widow	18 (0.4%)	9 (0.5%)	9 (0.4%)	
	No data available		22	30	
Education level	Illiterate	170 (4.5%)	65 (4.1%)	105 (4.7%)	<0.001

	Under diploma	1656 (43.5%)	741 (46.5%)	915 (41.3%)	
	Diploma	1464 (38.4%)	637 (39.9%)	827 (37.4%)	
	College Education	519 (13.6%)	152 (9.5%)	367 (16.6%)	
	No data available		220	263	
Kind of poisoning	Pharmaceutical agents **	2020 (47.5%)	533 (29.4%)	1487 (60.9%)	<0.001
	Opioids	789 (18.5%)	531 (29.3%)	258 (10.6%)	
	Stimulants	91 (2.1%)	58 (3.2%)	33 (1.4%)	
	Alcohol	223 (5.2%)	122 (6.7%)	101 (4.1%)	
	Pesticides	210 (4.9%)	69 (3.8%)	141 (5.8%)	
	Multiple substance toxicity	574 (13.5%)	386 (21.3%)	188 (7.7%)	
	Others*	347 (8.2%)	113 (6.2%)	234 (9.6%)	
	No data available		3	35	
Route of exposure	Oral	3802 (89.5%)	1586 (87.5%)	2216 (91.0%)	<0.001
	Inhalation	84 (2.0%)	44 (2.4%)	40 (1.6%)	
	Injection	21 (0.5%)	8 (0.4%)	13 (0.5%)	
	Dermal	4 (0.1%)	0 (0.0%)	4 (0.2%)	
	Multiple exposure	98 (2.3%)	76 (4.2%)	22 (0.9%)	
	Bite	84 (2.0%)	15 (0.8%)	69 (2.8%)	
	Unknown	153 (3.6%)	83 (4.6%)	70 (2.9%)	
	No data available		3	43	
Type of exposure	Accidental	857 (20.2%)	461 (25.5%)	396 (16.3%)	<0.001
	Intentional	3319 (78.4%)	1317 (72.8%)	2002 (82.5%)	
	Induced	60 (1.4%)	31 (1.7%)	29 (1.2%)	
	No data available		6	50	

Duration of hospitalization (hours)	Mean (SD)		19(27)	17(17)	<0.001
	Median (IQR)				
Past medical history	Yes	945 (22.0%)	455 (25.1%)	490 (19.8%)	<0.001
	No	3347 (78.0%)	1360 (74.9%)	1987 (80.2%)	
History of psychiatric disease	Yes	1208 (28.1%)	607 (33.4%)	601 (24.3%)	<0.001
	No	3084 (71.9%)	1208 (66.6%)	1876 (75.7%)	
Suicide history	Yes	975 (22.7%)	480 (26.4%)	495 (20.0%)	<0.001
	No	3317 (77.3%)	1335 (73.6%)	1982 (80.0%)	
Self-harm history	Yes	339 (7.9%)	212 (11.7%)	127 (5.1%)	<0.001
	No	3953 (92.1%)	1603 (88.3%)	2350 (94.9%)	
Criminal record history	Yes	187 (4.4%)	160 (8.8%)	27 (1.1%)	<0.001
	No	4105 (95.6%)	1655 (91.2%)	2450 (98.9%)	

Results are presented as numbers (percent) or means $\pm$ SD; Categorical variables were compared between groups with Fisher's exact or Chi-square tests, where appropriate. A p-value of less than 0.05 was considered statistically significant. **Pharmaceutical agents include prescription or over-the-counter therapeutic drugs *Others include other types of poisoning except for drugs, opioids, stimulants, alcohol, pesticide, and multi-substance poisoning (e.g., animal bite, gas-heavy metals, household chemicals, hydrocarbons, etc.)

Table 8. Clinical manifestation and outcomes of patients upon admission according to the history of substance use disorder (SUD)

Variables		Total	History of SUD	No history of SUD	P-value
Level of consciousness	Alert	3275 (77.4%)	1305 (72.5%)	1970 (81.1%)	<0.001
	Confusion/delirium	280 (6.6%)	155 (8.6%)	125 (5.1%)	
	Lethargy	278 (6.6%)	139 (7.7%)	139 (5.7%)	

	Obtundation	105 (2.5%)	50 (2.8%)	55 (2.3%)	
	Stupor	197 (4.7%)	108 (6.0%)	89 (3.7%)	
	Coma	94 (2.2%)	43 (2.4%)	51 (2.1%)	
	No data available		15	48	
Systolic blood pressure	MmHg	122.69 (18.22)	123.41 (19.07)	122.16 (17.54)	0.030
Diastolic blood pressure	mmHg	77.38 (12.80)	77.70 (13.40)	77.14 (12.33)	0.16
Pulse rate	Mean (SD)	89.82 (25.38)	90.51 (29.94)	89.32 (21.37)	0.13
Respiratory rate	Mean (SD)	17.64 (7.02)	17.44 (7.06)	17.79 (7.00)	0.12
Temperature	Mean (SD)	37.47 (13.13)	37.45 (12.75)	37.48 (13.40)	0.94
Intubation	Yes	189 (4.4%)	92 (5.1%)	97 (3.9%)	0.06
	No	4103 (95.6%)	1723 (94.9%)	2380 (96.1%)	
Outcome	Mortality	33 (0.9%)	20 (1.2%)	13 (0.6%)	0.03
	Recovery	3820 (99.1%)	1601 (98.8%)	2219 (99.4%)	
	Transfer to another department	11 (0.3%)	5 (0.3%)	6 (0.2%)	
	Discharge with personal consent	423 (9.9%)	186 (10.2%)	237 (9.6%)	
	Escape	5 (0.1%)	3 (0.2%)	2 (0.1%)	

Results are presented as numbers (percent) or means $\pm$ SD; Categorical variables were compared between groups with Fisher's exact or Chi-square tests or Mann–Whitney U test for non-normal continuous data, where appropriate. A P-value less than 0.05 was considered statistically significant.

Table 9. Demographic and toxicological characteristics and history of patients according to history of opioid substance use disorder (SUD)

		Total	OUD group N=346	Non-OUD group N= 1469	Without SUD N=2477	P-value
Age (year)	Mean (SD)	33.07 (14.98)	47.18 (14.91)	34.11 (13.94)	30.48 (14.40)	<0.001
			45(69)	32(79)	28(19)	

Age (year)	<20	858 (20.1%)	3 (0.9%)	206 (14.1%)	649 (26.3%)	<0.001
	20-40	2297 (53.7%)	135 (39.1%)	850 (58.0%)	1312 (53.2%)	
	41-65	940 (22.0%)	160 (46.4%)	357 (24.4%)	423 (17.2%)	
	>=65	181 (4.2%)	47 (13.6%)	52 (3.5%)	82 (3.3%)	
	No data available		1	4	11	
Gender	Female	2050 (47.8%)	47 (13.6%)	378 (25.7%)	1625 (65.6%)	<0.001
	Male	2242 (52.2%)	299 (86.4%)	1091 (74.3%)	852 (34.4%)	
Marital status	Single	2170 (51.2%)	96 (28.3%)	816 (56.1%)	1258 (51.4%)	<0.001
	Married	1970 (46.5%)	225 (66.4%)	598 (41.1%)	1147 (46.9%)	
	Divorced	82 (1.9%)	14 (4.1%)	35 (2.4%)	33 (1.3%)	
	Widow	18 (0.4%)	4 (1.2%)	5 (0.3%)	9 (0.4%)	
	No data available		7	15	30	
Education level	Illiterate	170 (4.5%)	17 (5.7%)	48 (3.7%)	105 (4.7%)	<0.001
	Under diploma	1656 (43.5%)	162 (54.5%)	579 (44.6%)	915 (41.3%)	
	Diploma	1464 (38.4%)	101 (34.0%)	536 (41.3%)	827 (37.4%)	
	College Education	519 (13.6%)	17 (5.7%)	135 (10.4%)	367 (16.6%)	
	No data available		49	171	263	
Type of poisoning	Drug	2020 (47.5%)	35 (10.1%)	498 (34.0%)	1487 (60.9%)	<0.001
	Opioids	789 (18.5%)	200 (57.8%)	331 (22.6%)	258 (10.6%)	
	Stimulants	91 (2.1%)	7 (2.0%)	51 (3.5%)	33 (1.4%)	
	Alcohol	223 (5.2%)	4 (1.2%)	118 (8.0%)	101 (4.1%)	
	Pesticides	210 (4.9%)	14 (4.0%)	55 (3.8%)	141 (5.8%)	
	Multi-substance	574 (13.5%)	66 (19.1%)	320 (21.8%)	188 (7.7%)	
	Others*	347 (8.2%)	20 (5.8%)	93 (6.3%)	234 (9.6%)	
	No data available		0	3	35	
Route of exposure	Oral	3802 (89.5%)	284 (82.1%)	1302 (88.8%)	2216 (91.0%)	<0.001
	Inhalation	84 (2.0%)	18 (5.2%)	26 (1.8%)	40 (1.6%)	
	Injection	21 (0.5%)	2 (0.6%)	6 (0.4%)	13 (0.5%)	
	Dermal	4 (0.1%)	0 (0.0%)	0 (0.0%)	4 (0.2%)	
	Multiple exposure	98 (2.3%)	14 (4.0%)	62 (4.2%)	22 (0.9%)	
	Bite	84 (2.0%)	1 (0.3%)	14 (1.0%)	69 (2.8%)	
	Unknown	153 (3.6%)	27 (7.8%)	56 (3.8%)	70 (2.9%)	
	No data available		0	3	43	
Mode of poisoning	Accidental	857 (20.2%)	128 (37.1%)	333 (22.7%)	396 (16.3%)	<0.001
	Intentional	3319 (78.4%)	208 (60.3%)	1109 (75.8%)	2002 (82.5%)	
	Induced	60 (1.4%)	9 (2.6%)	22 (1.5%)	29 (1.2%)	
	No data available		1	5	50	

Past medical history	Yes	945 (22.0%)	116 (33.5%)	339 (23.1%)	490 (19.8%)	<0.001
	No	3347 (78.0%)	230 (66.5%)	1130 (76.9%)	1987 (80.2%)	
History of psychiatric disease	Yes	1208 (28.1%)	82 (23.7%)	525 (35.7%)	601 (24.3%)	<0.001
	No	3084 (71.9%)	264 (76.3%)	944 (64.3%)	1876 (75.7%)	
Suicide history	Yes	975 (22.7%)	47 (13.6%)	433 (29.5%)	495 (20.0%)	<0.001
	No	3317 (77.3%)	299 (86.4%)	1036 (70.5%)	1982 (80.0%)	
Self-harm history	Yes	339 (7.9%)	12 (3.5%)	200 (13.6%)	127 (5.1%)	<0.001
	No	3953 (92.1%)	334 (96.5%)	1269 (86.4%)	2350 (94.9%)	
Criminal record history	Yes	187 (4.4%)	39 (11.3%)	121 (8.2%)	27 (1.1%)	<0.001
	No	4105 (95.6%)	307 (88.7%)	1348 (91.8%)	2450 (98.9%)	

Results are presented as numbers (percent) or means $\pm$ SD; Categorical variables were compared between groups with Fisher's exact or Chi-square tests or Mann–Whitney U test for non-normal continuous data, where appropriate. *Others, including other types of poisoning except for drugs, opioids, stimulants, alcohol, pesticide, and multi-substance poisoning (e.g., animal bite, gas-heavy metals, household chemicals, hydrocarbons, etc.)

Table 4. Clinical manifestation and outcomes of patients upon admission according to history of opioid use disorder (OUD)

Variables		Total	OUD N=346	Non OUD N= 1469	Without SUD N=2477	P- value
Level of consciousness	Alert	3275 (77.4%)	225 (65.6%)	1080 (74.1%)	1970 (81.1%)	<0.001
	Confusion/delirium	280 (6.6%)	40 (11.7%)	115 (7.9%)	125 (5.1%)	
	Lethargy	278 (6.6%)	33 (9.6%)	106 (7.3%)	139 (5.7%)	
	Obtundation	105 (2.5%)	8 (2.3%)	42 (2.9%)	55 (2.3%)	
	Stupor	197 (4.7%)	26 (7.6%)	82 (5.6%)	89 (3.7%)	
	Coma	94 (2.2%)	11 (3.2%)	32 (2.2%)	51 (2.1%)	
	No data available		3	12	48	
Systolic blood pressure (Mean $\pm$ SD)		122.69 (18.22)	124.35 (20.09)	123.18 (18.83)	122.16 (17.54)	0.000
Diastolic blood pressure (Mean $\pm$ SD)		77.38 (12.80)	77.68 (13.11)	77.70 (13.47)	77.14 (12.33)	0.000
Pulse rate (Mean $\pm$ SD)		89.82 (25.38)	88.35 (16.84)	91.01 (32.25)	89.32 (21.37)	0.000
Respiratory rate(Mean $\pm$ SD)		17.64 (7.02)	16.78 (5.79)	17.60 (7.32)	17.79 (7.00)	0.042
Temperature (Mean $\pm$ SD)		37.47 (13.13)	36.93 (0.31)	37.57 (14.16)	37.48 (13.40)	0.000
Heart sound (Mean $\pm$ SD)	Abnormal	346 (8.1%)	34 (9.8%)	127 (8.6%)	185 (7.5%)	0.19
Lung sound(Mean $\pm$ SD)	Abnormal	101 (2.4%)	18 (5.2%)	59 (4.0%)	24 (1.0%)	<0.001
Nausea and vomiting	Yes	918 (21.4%)	47 (13.6%)	268 (18.2%)	603 (24.3%)	<0.001

Diarrhea	Yes	61 (1.4%)	3 (0.9%)	24 (1.6%)	34 (1.4%)	0.53
Abdominal pain	Yes	265 (6.2%)	14 (4.0%)	86 (5.9%)	165 (6.7%)	0.14
	No	4027 (93.8%)	332 (96.0%)	1383 (94.1%)	2312 (93.3%)	
Duration of hospitalization	Mean (SD)	39.33 (75.71)	59.62 (123.07)	42.21 (73.38)	34.78 (67.44)	<0.001
	Median(IQR)		22(38)	19(24)	17(17)	
Endotracheal Intubation	Yes	189 (4.4%)	23 (6.6%)	69 (4.7%)	97 (3.9%)	0.054
	No	4103 (95.6%)	323 (93.4%)	1400 (95.3%)	2380 (96.1%)	
Outcome	Mortality	33 (0.9%)	8 (2.6%)	12 (0.9%)	13 (0.6%)	0.001
	Recovery	3820 (99.1%)	296 (97.4%)	1305 (99.1%)	2219 (99.4%)	

Results are presented as numbers (percent) or means $\pm$ SD. Where appropriate, categorical variables were compared between groups with Fisher's exact or Chi-square tests or the Mann-Whitney U test for non-normal continuous data.

Table 5. Logistic regression analysis of factors associated with a history of substance use disorder (SUD)

SUD History		OR (95% CI)	P-value
Gender	Male	4.891(4.11-5.82)	<0.001
	Female	1	-
Education level	Illiterate	1.16 (.74-1.84)	0.52
	Underdiploma	1.68 (1.23-2.19)	<0.001
	Diploma	1.57 (1.21-2.02)	0.001
	University	1	-
Marital status	Single	0.94 (0.30-2.93)	0.92
	Married	0.72 (0.23-2.22)	0.57
	Divorce	1.91 (0.55-6.69)	0.31
	Widow	1	-
Age	≥ 65	2.54 (1.57-4.09)	<0.001
	40-65	2.95 (2.17-4.00)	<0.001
	20-40	2.30 (1.81-2.93)	<0.001
	<20	1	-
Past medical history	Yes	1.22 (1.01-1.48)	0.042
	No	1	-
History of self-harm	Yes	2.24 (1.65-3.05)	<0.001

	No	1	-
History of a criminal conviction history	Yes	3.46 (2.04-5.89)	<0.001
	No	1	-
History of suicide	Yes	1.70 (1.38-2.08)	<0.001
	No	1	-
History of psychiatric disease	Yes	1.45 (1.20-1.75)	<0.001
	No	1	-
Type of poisoning	Opioids	3.44 (2.74-4.32)	<0.001
	Stimulants	2.76 (1.52-5.01)	0.001
	Alcohols	2.19 (1.54-3.12)	<0.001
	Bites	0.35 (0.16-.77)	0.009
	Others	1.46 (1.00-2.13)	0.050
	Multiple	3.29 (2.58-4.19)	<0.001
	Drugs	1	-

Univariable (unadjusted) logistic regression with listwise deletion (complete-case analysis); two-sided p-values and Wald 95% CIs are reported. Dependent variable: history of SUD (1 = Yes, 0 = No). Reference categories: Female (sex); University (education); Widow (marital status); <20 years (age); No (past medical history, psychiatric disease, prior suicide attempt, self-harm, criminal conviction); Drugs/Pharmaceuticals (type of poisoning). N varies by predictor due to missing data. Abbreviations: SUD, substance use disorder; OR, odds ratio; CI, confidence interval.

Epidemiological and clinical characteristics of acute poisoning among pediatric patients



Abstract

Introduction

Acute poisoning remains a global health concern, particularly among children. Understanding the epidemiological patterns and clinical characteristics of pediatric poisoning is crucial for developing effective prevention strategies. This study aimed to investigate the epidemiological and clinical characteristics of acute poisoning in patients under 20 years old admitted to a referral poisoning center in Iran.

Methods

The registry-based study was conducted on pediatric patients admitted to a major regional referral center in Isfahan, Iran, between May 5, 2023, and May 5, 2024. Data concerning demographics, toxicological characteristics, history, and outcome were collected. The associations between demographics and toxicological factors were estimated using multinomial regression.

Results

A total of 870 patients were included. The mean age was 15.96 ± 3.12 years, with a female predominance (62.2%). Pharmaceuticals (60.6%) were the most common cause of poisoning. Intentional poisoning accounted for 84.0% of the cases. Multinomial logistic regression analysis showed that male sex was independently associated with higher odds of non-drug-related poisonings, older age was associated with higher odds of stimulant poisonings and multiple-agent, and a history of suicide increased the odds of multiple-agent poisoning. The in-hospital mortality rate was 0.1%.

Discussion

This study found that acute poisoning in children and adolescents is mainly intentional and most commonly involves pharmaceuticals. Predictors in this study included gender, age, type of exposure, psychiatric history, addiction history, and history of suicide. Although mortality was very low, the high rate of intentional poisoning raises concern about underlying mental health problems and access to toxic substances.

Conclusion

Females and pharmaceutical ingestion were most common, with intentional poisoning being the leading cause, especially in older age groups. The results emphasize the need for improved emergency preparedness, collaboration on mental health, and targeted prevention strategies.

Keywords: poisoning, child, adolescent, epidemiology, intentional poisoning

Introduction

Acute poisoning is defined as the harmful effects resulting from short-term exposure to toxic substances such as chemicals, pharmaceuticals, biological agents, environmental, and occupational toxins [1]. According to a systematic review in 2022, Medications are the leading cause of poisoning among children in low- and lower-middle-income countries [2]. The most common routes of poisoning are ingestion, inhalation, skin/eye contact, or bites [3].

This condition is still a significant global health issue among pediatric populations in both developed and developing countries [4]. The morbidity and mortality caused by poisoning are substantial yet completely preventable [5]. In 2019, 2.2 million poisoning cases were reported globally, of whom 940,000 were younger than 20 years [2]. Another study in the United States reports that more than 1 million children under 19 were exposed to toxic substances [6]. In Iran, acute poisoning constitutes the third most prevalent cause of injury among children under 16 years presenting to emergency departments [5].

The epidemiology of pediatric poisoning, such as age group, sex ratio, intentional exposure, and substance ingestion, can vary across different regions. Social, cultural, and environmental factors may influence these patterns [5]. Among these factors, age and sex are key determinants: younger boys are more prone than girls to experience poisoning, which may be attributed to distinct developmental progression and behavioral exploration between genders [7, 8]. However, this trend

reverses during adolescence, where females demonstrate an increased rate of poisoning incidents [9]. This shift can be explained by emotional changes during puberty, as well as a higher susceptibility to intentional poisoning among females and adolescents [7, 10, 11].

Children are particularly vulnerable to poisoning because of their ongoing physiological and psychological development, coupled with limited awareness of substance toxicity and safety measures [12]. Although acute poisoning in pediatric patients can be life-threatening, over 85% of cases do not require medical intervention due to the low toxicity of the substance ingested or because the ingested amount is not clinically significant. Consequently, with timely diagnosis and appropriate management, the prognosis for most poisoning cases is highly favorable [5].

The establishment of poison control centers, the implementation of child-resistant packaging, early detection of toxic exposures, and advancements in medical care have been major contributors to the decline in childhood poisoning-related mortality and morbidity [2, 13]. In contrast, limited public awareness and the lack of poison control centers contribute to higher mortality and morbidity rates in developing countries, including Iran [14].

In order to conduct effective and tailored preventative measures, it is essential to identify the characteristics of pediatric poisoning [6]. The lack of a national database or coordinating authority has resulted in limited nationwide data from Iran, despite the existence of prior local studies in several cities [4]. Thus, this study aimed to examine the epidemiological patterns, clinical manifestations, and outcomes of acute poisoning in individuals aged ≤ 20 years at a referral poisoning center in Iran.

Method

Study Design and Setting

We conducted a retrospective observational registry-based study of children with acute poisoning, admitted to the poisoning emergency center of Khorshid hospital in Isfahan, the leading regional referral center for poisoned patients in the central part of Iran, affiliated to Isfahan University of Medical Science. This study was conducted in accordance with the principles of declaration of Helsinki. This study was approved by the ethics committee of Review Board of Isfahan University of Medical Science (IR.ARI.MUI.REC.1403.184). Informed consent had been obtained from all participants (or their surrogates) upon hospital admission.

Study Protocol

The registry database of Khorshid Hospital's Poisoning Emergency Center (KHPEC) is an ongoing registry database, launched in 2023, and continuously gathers data on patients with acute poisoning admitted to KHPEC. Detailed information regarding methodology of this study is reported separately (unpublished).

The selection of patients was based on the census sampling method. All consecutive patients under 20 years old, classified as pediatric cases, who presented at KHPEC with acute poisoning between May 5, 2023, and May 5, 2024, and had a record of hospitalization in the emergency room, department, or intensive care unit of KHPEC were included in our study. Patients who were transferred to other departments following the poisoning have been excluded. Any information

missing in the registration form was retrieved from the medical documents of patients in the hospital archives, if available.

Definition

According to the WHO, which defines adolescence as the age range of 10 to 19 years [15], our study population was considered as being under 20 years old. Diagnoses of type of acute poisoning were made by the attending physician treating the patient based on all available information, including self-reported histories from the pediatric patients or their parents, physical examinations, and laboratory findings when necessary.

Patients were divided into 8 following groups based on type of poisoning: 1)drugs (including analgesics, antimicrobials (antibiotics, antivirals and antifungals), antihistamines, antihypertension, anticoagulant, cardioactives, diabetes medications, hormones and gastrointestinal drugs, supplements, vitamins, neuroactive (including sedative-hipnotic, antidepressant, antipsychotics, antiepileptic drugs), respiratory, heavy metals, and others. 2)opioids (including opium, methadone, tramadol, buprenorphine, heroin, pethidine, codeine, oxycodone, morphine, dextromethorphan) 3)stimulants (cocaine, cannabinoids (marijuana, weed, cannabis, etc), amphetamines (crystal meth, ritalin, ecstasy, atomoxetine), pico, modafinil) 4)alcohol(ethanol, methanol, ethylene glycol, isopropyl alcohol) and hydrocarbons 5)bite (scorpion, snake) 6)pesticide (rodenticide, insecticide, fungicide, herbicide, acaricide, etc) 7)multiple substance poisoning (including at least one of which was listed in the first six categories) 8)other types of poisoning (including unknown poisoning, and medicinal and poisonous plants)

Data collection

Data were registered in a structured database by clinical research staff after being trained in a data collection form developed specifically for the study.

For each case following data were collected using KHPEC data registration system: demographic information (age, gender, marital status, level of education), addiction history, type of exposure (accidental, intentional, caused by others), past medical and drug history, previous psychiatric disease, suicide history, self-harm history, criminal record history, clinical manifestations on admission, hospital stay duration, intubation and outcome (personal consent, complete recovery, partial recovery and mortality). Clinical information, such as symptoms (including vital signs, mental status, respiratory, cardiac, GI, and general physical examination), vital signs at the time of admission, and treatments used (charcoal therapy and GI lavage), were also recorded.

Statistical analysis

Data were analyzed using version 21 of the Statistical Package for Social Sciences (SPSS Inc., Chicago, IL, USA). Continuous data were expressed as mean (SD) and median with interquartile range (IQR), whereas categorical data were presented as numbers (n) and/ or percentages (%). Normality of continuous variables was assessed by using the Kolmogorov-Smirnov test and Q-Q plot. Chi-square independent/ Fisher's exact test was used to assess associations between categorical variables and the studied group. ANOVA test was used for comparing normally and non-normally distributed continuous variables, respectively. The association of demographics and

toxicological factors was estimated using multinomial regression analysis and reported as odds ratio (OR) with 95% confidence interval (CI).

Results

During the study period, a total of 870 patients under 20 years old were included in our study (out of 6,443 patients with acute poisoning); 10 patients (1.2%) were excluded due to unknown poisoning. The mean (SD) age was 15.96 (3.12) years old (minimum: 1, maximum: 19). There was a female predominance with 62.2% ($N=529$) being female (male to female ratio of 1:1.65). Children aged over 10 years constituted the largest group presented at our hospital, accounting for 95.2% of the patients.

All the characteristics of the study population based on causative substances are summarized in table 1. Pharmaceuticals ($N = 521$, 60.6%) were the leading cause of poisoning, followed by multiple substance poisoning ($N=98$, 11.4%), opioids ($N=76$, 8.8%), alcohol ($N=55$, 6.4%), pesticide ($N=40$, 4.7%), bite ($N=17$, 2.0%), and stimulants ($N=16$, 1.9%). The ingested materials were classified under the "other" category in 27 cases. The majority of patients were single (94.9%). There were 707 cases of intentional exposure in this study, with the majority involving drug poisoning ($N=487$), followed by cases involving multiple substances ($N=84$) and opioids ($N=53$). The highest rate of accidental poisoning was in children with drug ($N=28$) and alcohol poisoning ($N=28$). Intentional poisoning was higher across all studied groups, except for alcohol poisoning, where more than half of the patients (50.9%) experienced accidental poisoning. 114 patients (13.4%) had past medical history, with a higher prevalence observed among those suffering from opioid (23.7%) or drug poisoning (14.2%). About one out of five patients had a history of psychiatric disease (24.5%) and suicide history (22.8%). A higher proportion of patients with multiple substance poisoning and drug poisoning had these histories.

There were significant differences among the studied groups in terms of age, gender, level of education, type of exposure, history of past medical diseases, drug consumption, psychiatric diseases, suicide, addiction, and self-harm ($P<0.05$).

Table 1. Characteristics of children admitted to the referral poisoning center in Iran due to acute poisoning, categorized by the type of substance consumed

		Total	Drugs N=521	Opioids N=76	Stimulants N=16	Alcohol* N=55	Bite N=17	Pesticide N=40	Multiple substance **N= 98	Other N=27	P-value
Age	Mean (SD)	15.96 (3.12)	15.83 (2.91)	14.74 (4.78)	17.31 (1.62)	16.07 (2.93)	15.06 (4.80)	16.77 (1.72)	16.95 (2.25)	16.60 (3.70)	<0.001
BMI		22.76 (4.34)	22.57 (3.90)	23.24 (6.52)	22.86 (2.94)	22.90 (4.89)	23.36 (5.39)	22.54 (3.84)	22.98 (4.20)	23.63 (4.98)	0.82
Gender	Male	321 (37.8%)	132 (25.3%)	35 (46.1%)	13 (81.3%)	37 (67.3%)	13 (76.5%)	17 (42.5%)	58 (59.2%)	16 (59.3%)	<0.001
	Female	529 (62.2%)	389 (74.7%)	41 (53.9%)	3 (18.8%)	18 (32.7%)	4 (23.5%)	23 (57.5%)	40 (40.8%)	11 (40.7%)	
Marital status	Single	799 (94.9%)	487 (94.4%)	73 (96.1%)	16 (100.0%)	52 (98.1%)	17 (100.0%)	34 (85.0%)	95 (97.9%)	25 (92.6%)	0.058
	Married	43 (5.1%)	29 (5.6%)	3 (3.9%)	0 (0.0%)	1 (1.9%)	0 (0.0%)	6 (15.0%)	2 (2.1%)	2 (7.4%)	
Education level	Illiterate	36 (4.6%)	13 (2.7%)	6 (8.5%)	1 (7.1%)	2 (4.3%)	2 (12.5%)	6 (15.8%)	2 (2.2%)	4 (16.0%)	0.009
	Under diploma	530 (67.6%)	340 (70.2%)	45 (63.4%)	8 (57.1%)	28 (59.6%)	7 (43.8%)	27 (71.1%)	61 (68.5%)	14 (56.0%)	
	Diploma	194 (24.7%)	115 (23.8%)	18 (25.4%)	4 (28.6%)	15 (31.9%)	7 (43.8%)	5 (13.2%)	24 (27.0%)	6 (24.0%)	
	College education	24 (3.1%)	16 (3.3%)	2 (2.8%)	1 (7.1%)	2 (4.3%)	0 (0.0%)	0 (0.0%)	2 (2.2%)	1 (4.0%)	
Type of exposure	Intentional	707 (84.0%)	487 (94.2%)	53 (71.6%)	9 (56.3%)	22 (40.0%)	0 (0.0%)	39 (97.5%)	84 (85.7%)	13 (52.0%)	<0.001
	Accidental	122 (14.5%)	28 (5.4%)	20 (27.0%)	6 (37.5%)	28 (50.9%)	17 (100.0%)	1 (2.5%)	12 (12.2%)	10 (40.0%)	
	By others	13 (1.5%)	2 (0.4%)	1 (1.4%)	1 (6.3%)	5 (9.1%)	0 (0.0%)	0 (0.0%)	2 (2.0%)	2 (8.0%)	
Past medical history	Yes	114 (13.4%)	74 (14.2%)	18 (23.7%)	2 (12.5%)	7 (12.7%)	1 (5.9%)	4 (10.0%)	8 (8.2%)	0 (0.0%)	0.037
	No	736 (86.6%)	447 (85.8%)	58 (76.3%)	14 (87.5%)	48 (87.3%)	16 (94.1%)	36 (90.0%)	90 (91.8%)	27 (100.0%)	

Past drug history	Yes	179 (21.1%)	126 (24.2%)	9 (11.8%)	6 (37.5%)	5 (9.1%)	0 (0.0%)	4 (10.0%)	24 (24.5%)	5 (18.5%)	0.002
	No	671 (78.9%)	395 (75.8%)	67 (88.2%)	10 (62.5%)	50 (90.9%)	17 (100.0%)	36 (90.0%)	74 (75.5%)	22 (81.5%)	
Previous psychiatric disease	Yes	208 (24.5%)	143 (27.4%)	8 (10.5%)	4 (25.0%)	5 (9.1%)	0 (0.0%)	3 (7.5%)	39 (39.8%)	6 (22.2%)	<0.001
	No	642 (75.5%)	378 (72.6%)	68 (89.5%)	12 (75.0%)	50 (90.9%)	17 (100.0%)	37 (92.5%)	59 (60.2%)	21 (77.8%)	
Under treatment psychiatric	Yes	142 (16.7%)	102 (19.6%)	5 (6.6%)	3 (18.8%)	4 (7.3%)	0 (0.0%)	3 (7.5%)	23 (23.5%)	2 (7.4%)	0.002
	No	708 (83.3%)	419 (80.4%)	71 (93.4%)	13 (81.3%)	51 (92.7%)	17 (100.0%)	37 (92.5%)	75 (76.5%)	25 (92.6%)	
Suicide history	Yes	194 (22.8%)	129 (24.8%)	14 (18.4%)	3 (18.8%)	2 (3.6%)	0 (0.0%)	8 (20.0%)	37 (37.8%)	1 (3.7%)	<0.001
	No	656 (77.2%)	392 (75.2%)	62 (81.6%)	13 (81.3%)	53 (96.4%)	17 (100.0%)	32 (80.0%)	61 (62.2%)	26 (96.3%)	
Type of past suicide	Poisoning	126 (66.0%)	82 (64.6%)	10 (71.4%)	3 (100.0%)	0 (0.0%)	-	4 (50.0%)	27 (75.0%)	0 (0.0%)	0.13
	Others	65 (34.0%)	45 (35.4%)	4 (28.6%)	0 (0.0%)	2 (100.0%)	-	4 (50.0%)	9 (25.0%)	1 (100.0%)	
Suicide family history	Yes	42 (4.9%)	26 (5.0%)	3 (3.9%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (5.0%)	9 (9.2%)	2 (7.4%)	0.26
	No	808 (95.1%)	495 (95.0%)	73 (96.1%)	16 (100.0%)	55 (100.0%)	17 (100.0%)	38 (95.0%)	89 (90.8%)	25 (92.6%)	
Addiction history	Yes	209 (24.6%)	93 (17.9%)	25 (32.9%)	4 (25.0%)	17 (30.9%)	1 (5.9%)	11 (27.5%)	49 (50.0%)	9 (33.3%)	<0.001
	No	641 (75.4%)	428 (82.1%)	51 (67.1%)	12 (75.0%)	38 (69.1%)	16 (94.1%)	29 (72.5%)	49 (50.0%)	18 (66.7%)	
Criminal record history	Yes	7 (0.8%)	3 (0.6%)	0 (0.0%)	1 (6.3%)	0 (0.0%)	0 (0.0%)	1 (2.5%)	2 (2.0%)	0 (0.0%)	0.15
	No	843 (99.2%)	518 (99.4%)	76 (100.0%)	15 (93.8%)	55 (100.0%)	17 (100.0%)	39 (97.5%)	96 (98.0%)	27 (100.0%)	
Self-harm history	Yes	97 (11.4%)	62 (11.9%)	6 (7.9%)	3 (18.8%)	2 (3.6%)	0 (0.0%)	2 (5.0%)	21 (21.4%)	1 (3.7%)	0.005
	No	753 (88.6%)	459 (88.1%)	70 (92.1%)	13 (81.3%)	53 (96.4%)	17 (100.0%)	38 (95.0%)	77 (78.6%)	26 (96.3%)	

* including alcohol and hydrocarbon poisoning ** including at least one of which was listed in the first six categories

BMI= Body mass index
SD= Standard Deviation

Physical examination upon admission was presented in Table 2. According to the results, the most common sign detected in patients at the time of hospitalization was nausea and vomiting (28.7%, $N=244$), which was more common among patients with pesticide (47.5%), alcohol (38.2%), drug (30.7%), and opioid (27.6%) poisoning. Upon presentation at the hospital, 87.0% of patients were alert. A higher proportion of altered mental status was observed among patients with alcohol poisoning (35.2%), followed by stimulants (31.2%), multiple substance poisoning (19.6%), and opioids (14.5%). Abnormal findings were observed in 0.7% of patients during neurological examinations, 0.9% in lung auscultation, and 7.3% in heart auscultation.

In most cases, treatment was non-specific, including general decontamination and symptomatic treatment. Gastric lavage was performed in 41.3% of children, and activated charcoal was administered to 66.1% of patients. During hospitalization, 3.9% of patients required admission to the ICU. Children with pesticide poisoning had a higher proportion of ICU admission (15.0%). Seventeen patients were intubated; the majority belonged to the drug and "other" poisoning group. The mean length of the hospital stay in the current study, was 26.52 (39.88) hours. Out of all patients, 86.4% were discharged with complete recovery, 12.6% left by personal consent, and 0.9% were discharged with partial recovery. One death (0.1%) was recorded in a child with multiple substance poisoning during the study period. Significant differences were observed among the study groups in terms of level of consciousness, oxygen saturation, lung auscultation, nausea and vomiting, duration of hospitalization, ICU admission, intubation, and outcomes ($P<0.05$).

Table 2. Initial physical examination findings of children with acute poisoning admitted to the referral poisoning center in Iran.

		Total	Drugs $N=521$	Opioids $N=76$	Stimulants $N=16$	Alcohol* $N=55$	Bite $N=17$	Pesticide $N=40$	Multiple substance ** $N=98$	Other $N=27$	P- value
Level of consciousness	Alert	734 (87.0%)	473 (91.5%)	65 (85.5%)	11 (68.8%)	35 (64.8%)	17 (100.0%)	38 (95.0%)	78 (80.4%)	17 (63.0%)	<0.001
	Confusion/delirium	32 (3.8%)	14 (2.7%)	2 (2.6%)	4 (25.0%)	3 (5.6%)	0 (0.0%)	1 (2.5%)	6 (6.2%)	2 (7.4%)	
	Lethargy	36 (4.3%)	15 (2.9%)	5 (6.6%)	1 (6.3%)	7 (13.0%)	0 (0.0%)	1 (2.5%)	5 (5.2%)	2 (7.4%)	
	Obtundation	10 (1.2%)	6 (1.2%)	1 (1.3%)	0 (0.0%)	1 (1.9%)	0 (0.0%)	0 (0.0%)	1 (1.0%)	1 (3.7%)	
	Stupor	24 (2.8%)	7 (1.4%)	3 (3.9%)	0 (0.0%)	6 (11.1%)	0 (0.0%)	0 (0.0%)	5 (5.2%)	3 (11.1%)	
	Coma	8 (0.9%)	2 (0.4%)	0 (0.0%)	0 (0.0%)	2 (3.7%)	0 (0.0%)	0 (0.0%)	2 (2.1%)	2 (7.4%)	
Systolic blood pressure	mmHg	120.56 (16.42)	121.44 (16.43)	117.97 (19.73)	127.73 (16.36)	118.67 (15.34)	119.59 (16.29)	118.73 (12.75)	119.70 (15.54)	117.04 (15.57)	0.25

Diastolic blood pressure	mmHg	75.79 (12.11)	76.41 (12.25)	72.83 (11.61)	79.47 (10.66)	73.71 (9.81)	77.41 (9.63)	75.20 (9.25)	75.77 (14.60)	74.33 (10.02)	0.21
Pulse rate	Mean (SD)	92.36 (27.19)	92.28 (31.24)	97.07 (16.35)	105.20 (21.80)	95.35 (21.35)	93.82 (17.63)	90.90 (19.28)	87.27 (18.91)	87.22 (14.24)	0.15
Respiratory rate	Mean (SD)	18.32 (9.78)	18.17 (7.54)	18.24 (10.52)	17.75 (1.44)	20.11 (22.06)	19.53 (4.90)	19.65 (14.49)	17.82 (8.96)	17.26 (17.00)	0.83
Temperature	Mean (SD)	37.69 (16.05)	38.18 (20.51)	36.91 (0.30)	37.05 (0.16)	36.91 (0.31)	36.97 (0.32)	36.90 (0.29)	36.92 (0.33)	36.90 (0.27)	0.99
O2 saturation	Mean (SD)	95.54 (4.21)	96.21 (2.41)	92.21 (8.77)	96.27 (1.79)	95.42 (2.50)	96.65 (1.22)	95.52 (3.53)	94.40 (6.05)	95.37 (4.59)	<0.001
Duration of hospitalization	Mean (SD)	26.52 (39.88)	23.49 (30.56)	30.37 (24.25)	15.19 (10.55)	17.53 (24.51)	26.18 (28.66)	40.65 (61.22)	41.00 (76.64)	25.96 (25.18)	0.001
Heart auscultation	Abnormal	62 (7.3%)	36 (6.9%)	9 (11.8%)	2 (12.5%)	3 (5.5%)	1 (5.9%)	3 (7.5%)	6 (6.1%)	2 (7.4%)	0.82
Lung auscultation	Abnormal	8 (0.9%)	1 (0.2%)	4 (5.3%)	0 (0.0%)	1 (1.8%)	0 (0.0%)	0 (0.0%)	1 (1.0%)	1 (3.7%)	0.003
Bowel sound	Abnormal	1 (0.1%)	1 (0.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	>0.99
Nausea/Vomiting	N (%)	244 (28.7%)	160 (30.7%)	21 (27.6%)	2 (12.5%)	21 (38.2%)	0 (0.0%)	19 (47.5%)	18 (18.4%)	3 (11.1%)	<0.001
Diarrhea	N (%)	17 (2.0%)	10 (1.9%)	1 (1.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (2.5%)	4 (4.1%)	1 (3.7%)	0.71
Abdominal pain	N (%)	77 (9.1%)	51 (9.8%)	6 (7.9%)	0 (0.0%)	6 (10.9%)	0 (0.0%)	6 (15.0%)	6 (6.1%)	2 (7.4%)	0.45
Neurological examination	N (%)	6 (0.7%)	3 (0.6%)	1 (1.3%)	1 (6.3%)	1 (1.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0.20
Charcoal therapy	N (%)	553 (66.1%)	419 (81.8%)	38 (51.4%)	4 (28.6%)	4 (7.3%)	0 (0.0%)	21 (52.5%)	54 (55.1%)	13 (48.1%)	<0.001
Lavage	N (%)	345 (41.3%)	257 (50.2%)	23 (31.1%)	4 (28.6%)	4 (7.3%)	0 (0.0%)	19 (47.5%)	33 (33.7%)	5 (18.5%)	<0.001
ICU admission	N (%)	33 (3.9%)	13 (2.5%)	2 (2.6%)	1 (6.3%)	2 (3.6%)	0 (0.0%)	6 (15.0%)	7 (7.1%)	2 (7.4%)	0.004
Intubation	N (%)	17 (2.0%)	5 (1.0%)	2 (2.6%)	1 (6.3%)	2 (3.6%)	0 (0.0%)	2 (5.0%)	2 (2.0%)	3 (11.1%)	0.009
Outcome	Partial recovery	8 (0.9%)	1 (0.2%)	1 (1.3%)	1 (6.3%)	0 (0.0%)	1 (5.9%)	4 (10.0%)	0 (0.0%)	0 (0.0%)	<0.001
	Personal consent	107 (12.6%)	74 (14.2%)	10 (13.2%)	2 (12.5%)	1 (1.8%)	0 (0.0%)	7 (17.5%)	10 (88.8%)	3 (11.1%)	

	Complete recovery	734 (86.4%)	446 (85.6%)	65 (85.5%)	13 (81.3%)	54 (98.2%)	16 (94.1%)	29 (72.5%)	87 (88.8%)	24 (88.9%)	
	Death	1 (0.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (1.0%)	0 (0.0%)	

* including alcohol and hydrocarbon poisoning ** including at least one of which was listed in the first six categories

ICU= Intensive Care Unit

Table 3 presents the results of the multinomial logistic regression. Acute medication poisoning group served as the reference group for the dependent variable. Results showed that most independent variables were significantly associated with all the dependent groups compared with the reference group. Being male increased the odds of all studied group relative to the drug poisoning groups ($P<0.05$). Moreover, past drug history and history of psychiatric disease decreased the odds of opioid, alcohol and pesticide poisoning relative to the reference group. Being under psychiatric treatment decreased the odds of opioid and alcohol poisoning relative to drug poisoning ($p<0.05$). For "other" poisoning group relative to the reference group, the direction of suicide history was the same that of those for alcohol poisoning ($p<0.05$). History of psychiatric disease, suicide and self-harm increased odds of multiple substance poisoning relative to reference group ($p<0.05$). Additionally, a history of addiction increased the risk of poisoning with opioids, alcohol, other substances, and multiple agents ($p<0.05$).

Table 3. Results of the multinomial logistic regression

		Opioids		Stimulants		Alcohol		Bite		Pesticide		Others		Multiple	
		OR (95%CI)	P-value	OR (95%CI)	P-value	OR (95%CI)	P-value	OR (95%CI)	P-value	OR (95%CI)	P-value	OR (95%CI)	P-value	OR (95%CI)	P-value
Age		0.92 (0.87-0.98)	0.008	1.34 (1.002-1.801)	0.048	1.03 (0.93-1.13)	0.59			1.15 (0.99-1.34)	0.061	1.11 (0.94-1.31)	0.22	1.20 (1.08-1.34)	0.001
Gender	Female	0.40 (0.24-0.65)	<0.001	0.08 (0.022-0.28)	<0.001	0.17 (0.09-0.30)	<0.001	0.10 (0.03-0.33)	<0.001	0.46 (0.24-0.89)	<0.001	0.23 (0.11-0.52)	<0.001	0.23 (0.15-0.37)	<0.001
	Male	1	-	1	-	1	-	1	-	1	-	1	-	1	-
Level of education		0.86 (0.55-1.33)	0.49	1.25 (0.53-2.95)	0.62	1.26 (0.78-2.05)	0.35	1.11 (0.48-2.53)	0.81	0.35 (0.18-0.68)	0.002	0.69 (0.33-1.45)	0.33	1.05 (0.71-1.53)	0.82
Addiction history		2.27 (1.33—3.84)	0.003	1.53 (0.47-4.76)	0.47	2.04 (1.11-3.84)	0.021	0.28 (0.03-2.17)	0.23	1.75 (0.83-3.57)	0.13	2.27 (1.00-5.26)	0.049	4.54 (2.94-7.14)	<0.001

Type of exposure	Accidental	6.56 (3.46-12.45)	<0.001	11.60 (3.86-34.87)	<0.001	22.14 (11.26-43.52)	<0.001	-	-	0.45 (0.06-3.37)	0.43	13.38 (5.40-33.18)	<0.001	2.49 (1.22-5.80)	0.013
	Caused by others	4.59 (0.41-51.52)	0.22	27.06 (2.25-326.12)	0.009	55.34 (10.17-301.)	<0.001	-	-	-	-	37.46 (4.89-286.9)	<0.001	5.80 (0.81-41.7)	0.081
	Intentional	1	-	1	-	1	-	1	-	1	-	1	-	1	-
Past drug history		0.42 (0.20-0.87)	0.019	1.88 (0.67-5.28)	0.23	0.31 (0.12-0.80)	0.016	-	-	0.35 (0.12-0.998)	0.049	0.71 (0.26-1.92)	0.50	1.02 (0.62-1.68)	0.95
	No	1													
Previous psychiatric disease	Yes	0.31 (0.15-0.66)	0.003	0.88 (0.28-2.78)	0.83	0.26 (0.10-0.68)	0.005	-	-	0.21 (0.07-0.71)	0.011	0.76 (0.30-1.91)	0.55	1.75 (1.12-2.74)	0.015
	No														
Under psychiatric treatment		0.29 (0.11-0.74)	0.009	0.95 (0.27-3.39)	0.93	0.32 (0.11-0.91)	0.033	-	-	0.33 (0.10-1.10)	0.072	0.33 (0.08-1.41)	0.13	1.26 (0.75-2.11)	0.38
Suicide history		0.69 (0.37-1.27)	0.23	0.70 (0.20-2.50)	0.58	0.12 (0.03-0.48)	0.003	-	-	0.76 (0.34-1.69)	0.50	0.12 (0.016-0.87)	0.036	1.84 (1.17-2.90)	0.008
Self-harm history		0.64 (0.27-1.52)	0.31	1.71 (0.47-6.61)	0.41	0.28 (0.07-1.18)	0.082	-	-	0.39 (0.09-1.66)	0.20	0.29 (0.04-2.14)	0.22	2.02 (1.16-3.50)	0.012

*Reference group = acute drug poisoning

OR= Odds Ratio

CI= Confidence Interval

Discussion

Acute poisoning is one of the most common pediatric emergencies and occurs following exposure to a toxic substance, leading to injury or fatal outcomes [16]. Given that its epidemiological patterns vary across countries, conducting region-specific epidemiological investigations is essential to identify effective prevention strategies [4]. The present study provides a comprehensive overview of the demographic, toxicological, and clinical characteristics of pediatric acute poisoning in a major referral center in Iran.

In this study, several predictors were identified for poisoning in children under the age of 20, including gender, age, type of exposure, psychiatric history, addiction history, and history of suicide or self-harm. Notably, gender appeared as an important determinant, with a higher proportion of female patients, consistent with hospital-based studies from southern Iran and China [14, 17]. In contrast, other studies from Iran and various regions, including India and Taiwan, have reported a predominance of male patients [18-20]. Variations in the age distribution of the pediatric populations across different studies might explain this difference. Previous studies suggest that while poisoning is more common in younger children overall, sex-specific patterns emerge with increasing age, with females showing higher rates during adolescence [20, 21]. Additionally, female dominance in pediatric poisonings might be related to gender differences in emotional and mental health, including higher rates of suicide attempts among girls [22].

Despite the overall female predominance, our multinomial regression analysis demonstrated that being male significantly increased the odds of all types of poisoning compared to drug-related cases. This finding suggests that boys may be exposed to a higher risk of poisoning than girls. This pattern may reflect underlying developmental and behavioral factors, as boys tend to exhibit higher levels of curiosity and exploratory behavior [23, 24].

In addition to sex, age can also play a significant role in influencing the patterns of pediatric poisoning. As the age increases, the odds of stimulant-related and multiple-agent poisoning increases as well. Likely because older children and adolescents have easier access to medications and substances, engage in riskier behaviors, and have a higher prevalence of intentional exposures. In contrast, younger children are commonly poisoned by accident and with a single substance. Previous epidemiological reviews also report similar age-related patterns. They indicate that adolescent poisonings are more frequently involved with multiple substances and misuse of licit or illicit drugs [25, 26].

The variability of substances involved in pediatric poisoning by age and sex highlights the importance of examining specific agents in different pediatric groups. Based on our findings, males accounted for a higher proportion of stimulant, alcohol, multiple substance poisoning, and bites. In contrast, females were more frequently represented in cases involving drugs, opioids, and pesticides. This variation in results may reflect differences in gender socialization, as societal norms in certain regions limit girls' participation in outdoor activities and discourage risk-taking behaviors [13, 27].

In the present study, drug ingestion was the most common cause of pediatric poisoning, followed by multiple substance poisoning, opioids, alcohol, and pesticides. Several Iranian hospital-based studies have similarly reported that pharmaceuticals are the leading cause of

..... pediatric poisoning. For example, a study conducted in Kermanshah, Iran, found that drugs accounted for 44.2% of poisoning cases, surpassing other substances [10]. Consistently, a national review of studies on pediatric poisoning in Iran from 2000 to 2022 reported drugs, narcotics, and opium (mostly methadone) as the most common causes of poisoning [28].

While patterns of poisoning may vary regionally, certain substances (especially opioids) pose a consistent risk to children worldwide; for instance, in the United States, opioids are the most common substances contributing to fatal poisonings among young children (<5) [29]. This study indicated that a history of substance use increases the risk of poisoning by opioids, alcohol, other substances, and multiple agents. Likewise, Cantor et al. (2001) suggest that a child can be at a higher risk of fatal opioid poisoning if either the child or the caregiver has a history of substance use [30].

Consistently, histories of suicide or self-harm were linked to increased odds of multiple-agent poisonings, aligning with Tay et al. (2021), who reported that self-harming behaviors were associated with an increased risk of poisoning in pediatric populations [31]. Recognition of intentional poisoning in pediatric patients is therefore crucial, as it may be indicative of underlying psychosocial distress and warrants consideration of possible child abuse [32]. In our investigation, the majority of acute poisoning cases were intentional, primarily in individuals over 10 years old, with a predominance of females. A study from Singapore similarly reported that all children with acute intentional poisoning were older than 10 years [31]. Psychiatric disorders, heightened emotional distress during adolescence, as well as earlier puberty onset and hormonal changes may contribute to a higher tendency toward self-harm among girls [33, 34].

Our findings revealed that a history of suicide was more prevalent among patients with multiple substance, drug, stimulant, and opioid poisonings, with poisoning being the most common method of suicide among most of them. Addressing the issue of intentional poisoning among children requires collaborative efforts involving pediatricians, psychologists, teachers, child psychiatrists, and parents. One important preventive measure is limiting adolescents' access to common methods of suicide and prevalent risk factors, including alcohol, drugs, and online content [35].

Malicious administration of pharmaceuticals has been reported to be an important form of child abuse [36]. In our analysis, poisoning caused by another individual (intentional or unintentional) was associated with markedly higher odds of stimulant-, alcohol-, and "other"-category poisonings compared with drug-related poisoning (odds ratios of 27, 55, and 35, respectively). In a sentinel article, researchers examined pharmaceutical exposures coded as "malicious" in children <7 years of age, as reported to the NPDS from 2000 to 2008; 1439 cases met the inclusion criteria. At least one sedative was used in 51% of the cases. The most frequently reported major pharmaceutical categories included analgesics, stimulants/street drugs, sedatives/hypnotics/antipsychotics, cough and cold preparations, and ethanol [36].

Childhood poisoning in our setting was associated with a very low mortality rate (0.1%). One death was recorded in a child with multiple substance poisoning during the study period. This rate is significantly lower than the 1.5% reported in a previous study conducted at the same hospital on patients under 10 years 4, and the 3.7% reported in studies from India [37]. However, this is comparable to the findings from Italy and Taiwan, where no deaths were recorded. [20, 38]. The pediatric poisoning mortality rate in Iran decreased from 0.9% in

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2002 to 0.6% in 2019 [5]. One explanation for the low fatality rate is that children typically consume small amounts of toxic substances because of their unpleasant taste [5]. It should also be noted that our center primarily serves as a referral poisoning center for acute adult poisoning cases. Patients under the age of 18 years are typically admitted to a pediatric unit at a separate hospital specifically designated for the care of children.

Limitation

The main limitation of this study is its retrospective design; some of the medical data were not recorded in the files of patients in a busy ED. Another limitation is that our center is a main referral poisoning center for acute adult poisoning, and patients under 18 years are typically admitted to a pediatric unit in another hospital to receive services related to children. However, many are unaware of the services offered by our center for this age group. Thus, this could cause some selection bias.

Conclusion

This study provides valuable insights into the epidemiological patterns and clinical characteristics of acute poisoning in children and adolescents admitted to a referral poisoning center in Iran. Our findings highlight the predominance of female patients and pharmaceutical ingestion, particularly intentional poisoning, as the leading cause of poisoning in this population. Despite the female predominance in our study, being male significantly increased the odds of all types of poisoning compared to drug-related cases. Although the mortality rate was remarkably low, the significant proportion of intentional poisonings, especially among older children and adolescents, raises serious concerns about underlying mental health issues and the accessibility of toxic substances. These findings may help ED physicians improve their preparations for pediatric poisoning cases and allow public health authorities to sharpen the focus of poisoning prevention efforts. Future research should focus on exploring the specific motivations behind intentional poisoning in this age group, developing targeted prevention strategies, and strengthening collaboration between healthcare providers, mental health professionals, and public health agencies to effectively address this complex issue and reduce the burden of pediatric poisoning in Iran.

Data Availability Statement

The data supporting this study's findings are available from the corresponding author upon reasonable request.

Additional Information

The authors reported no potential conflict of interest.

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Author contributions

RM: Conceptualization, Project administration, Data curation, Resources, Supervision, Visualization, Writing- Reviewing and Editing MT, AM: Investigation, Data gathering, Writing- Original draft preparation AF: Methodology, Software, Data Curation, Validation KM: Writing- Reviewing and Editing RK: Conceptualization, Project administration, Data curation, Resources, Supervision. Visualization, Writing- Reviewing and Editing NE: Conceptualization, Project administration, Data curation, Supervision All authors approved the final version of the manuscript.

مقاله شماره ۸:

A Registry-Based Analysis of Acute Poisoning: Epidemiological Trends and Clinical Outcomes in a Referral Center in Iran

Abstract

Background

Acute poisoning is a significant public health concern worldwide, contributing to substantial morbidity and mortality. The epidemiological patterns and clinical outcomes of poisoning cases vary based on age, gender, and seasonal factors, necessitating region-specific investigations. This study aims to assess the demographic characteristics, clinical presentations, and outcomes of acute poisoning cases in a major referral poisoning center in Iran.

Methods

A retrospective observational study was conducted at Khorshid Hospital's Poisoning Emergency Center (KHPEC) in Isfahan, Iran. Data were extracted from the hospital's poisoning registry for all acute poisoning cases admitted between May 5, 2023, and May 5, 2024. Patient demographic data, clinical findings, and treatment outcomes were collected. Statistical analyses were performed using SPSS version 26.

Results

A total of 4,292 patients were included, with a mean age of 33.07 (14.98) years (range: [1]–[102] years). Males accounted for 52.2% (n=2,242) and females for 47.8% (n=2,050). The most common type of poisoning was drug-related (47.1%), followed by opioids (18.4%), multiple substances (13.4%), pesticides (4.9%), alcohol (5.2%), and stimulants (2.1%). Intentional poisoning (78.4%) was more common than accidental poisoning (20.2%), particularly among women and younger adults. Males had higher rates of opioid, alcohol, and stimulant poisoning, whereas drug-related poisoning was predominant among females. Age-related differences were observed, with the 20–40-year age group accounting for the highest proportion of poisoning cases (53.7%). Older adults (≥ 65 years) exhibited the highest proportion of mortality (4.2%). Seasonal variations were also significant, with intentional poisoning had highest proportion in autumn and accidental poisoning being more common in winter.

.....ICU admission was required in 8.5% of cases. Mortality was low (0.9%), with the highest fatality rates observed in pesticide (3.9%) and opioid poisoning (1.4%).
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Conclusion

This study highlights significant gender, age, and seasonal variations in acute poisoning patterns. Drug poisoning was the most common form of intoxication, with intentional self-poisoning prevalent among young adults and females, whereas opioid and pesticide poisoning were associated with higher mortality, particularly among elderly and males. The findings emphasize the need for targeted mental health interventions, substance use prevention programs, and stricter regulations on prescription drugs and pesticides. Public health policies should be tailored to high-risk populations, ensuring effective poisoning prevention and management strategies.

Keywords:

Acute poisoning, Season, Gender, Age

Introduction

Acute poisoning remains a significant global public health concern, contributing to substantial morbidity and mortality(1). In many countries, poisoning represents one of the leading causes of emergency department visits (2). In 2016, the WHO reported that unintentional poisoning resulted in 106,683 deaths and a loss of 6.3 million healthy life years(2). Over the past several decades, rates of drug poisoning deaths have increased dramatically in many countries (3, 4). The number of overdoses from synthetic opioids and stimulants has also increased in recent years(5). Snakebites accounted for an estimated 81,000 to 137,000 deaths annually(2).

In developed countries the most common cause of acute poisoning is the abuse of commercially available pharmaceuticals while in developing countries, pesticides are among the most common cause. Widespread pesticide use in developing countries increased its poisoning incidences(6). About 20% of global suicides are due to pesticide self-poisoning, specially in rural agricultural areas in low- and middle-income countries(2). Iran is a developing country. In recent years, the number of acute poisoning cases in Iran has continued to increase. Isfahan is the provincial capital of Isfahan and the biggest city in central part of Iran, with an estimated population of more than 5 million. Isfahan is an industrial province, but agriculture remains a vital component of its economy.

The majority of acute poisoning cases admitted to emergency departments are intentional self-poisoning rather than accidental(7). International studies have reported age, childhood adversity, recent life events and psychiatric morbidity such as depression, hopelessness and alcohol misuse, to be associated with increased risk of suicidal attempts among men and women(8, 9).

The pattern of acute poisoning, as well as the toxic agents contributing to morbidity and mortality are dynamic and may vary according to age and from place to place and over time(10, 11). The problem is getting worse as newer drugs and chemicals continue to



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.....increase(12). Timely diagnosis and proper management of poisoning are crucial for reducing morbidity and preventing mortality and are often life-saving(12, 13).

To address this issue, identifying the general pattern of poisoning in a particular region are imperative. Therefore, this study aims to examine the epidemiological characteristics, clinical features, and outcomes of acute poisoning cases in a referral poisoning center in Iran, to provide valuable epidemiological insights that can inform policy decisions, enhance preventive measures, and improve patient management strategies. The overall objective of this study was to describe gender, age and seasonal differences in patients with acute poisoning

Method

Study Design and Setting

We conducted a retrospective observational registry-based study of patients with acute poisoning, admitted to the poisoning emergency center of Khorshid hospital in Isfahan, the leading regional referral center for poisoned patients in central part of Iran, affiliated to Isfahan University of medical science. This study was conducted in accordance with the principles of declaration of Helsinki. This study was approved by the ethics committee of Review Board of Isfahan University of medical science ().

Study Protocol

The registry database of Khorshid Hospital's Poisoning Emergency Center (KHPEC) is an ongoing registry database, launched in 2023 and continuously gather data on patients with acute poisoning admitted to KHPEC. Detailed information regarding methodology of this study is reported separately (unpublished). All consecutive patients presented at KHPEC with acute poisoning between May 5, 2023, and May 5, 2024, and had a record of hospitalization in the emergency room, department, or intensive care unit of KHPEC were included in our study. Patients who were transferred to other departments following the poisoning have been excluded. Any information missing in the registration form was retrieved from the medical documents of patients in the hospital archives, if available. Patient with incomplete data record more than 20% were excluded from this study.

Definition

Diagnoses of acute poisoning were made by the attending physician treating the patient based on all available information including self-reported histories from the patients or their companion, physical examinations, and laboratory findings when necessary.

Patients were divided into 7 following groups based on type of poisoning: 1)drugs (including multi drug toxicity, analgesics, antimicrobials (antibiotics, antivirals and antifungals), antihistamines, antihypertentions, anticoagulant, cardioactives, diabetes medications, hormones and gastrointestinal drugs, supplements, vitamins, neuroactive (including sedative-hipnotic, antidepressant, antipsychotics, antiepileptic drugs), respiratory, heavy metals and others. 2)opioids (including opium, methadone, tramadol, buprenorphine, heroin, pethidine, codeine, oxycodone, morphine, dextromethorphan) 3)stimulants (cocaine, cannabinoids (marijuana, weed, cannabis and etc), amphetamines (crystal meth, ritalin, ecstasy, atomoxetine), pico, modafinil) 4)alcohol(ethanol, methanol, ethylene glycol, isopropyl alcohol) 5)pesticide (rodenticide, insecticide, fungicide, herbicide, acaricide and

.....etc) 6)multiple substance poisoning (including at least one of which was listed in the first six categories) 7)other types of poisoning (including animal bites, hydrocarbons, heavy metals, gas poisoning, unknown poisoning, and medicinal and poisonous plants)

Data collection

Data were registered in a structured database by clinical research staff after being trained in a data collection form developed specifically for the study.

For each case following data were collected using KHPEC data registration system: demographic information (age, gender, marital status, level of education), addiction history, type of exposure (accidental, intentional, caused by other), past medical and drug history, previous psychiatric disease, being under psychiatric treatment, suicide history, suicide family history, self-harm history, criminal record history, clinical manifestations on admission, duration of hospitalization, CPR, intubation and outcome (personal consent, complete recovery, partial recovery and mortality). Clinical information such as symptoms (including level of consciousness, respiratory, cardiac, GI, neurological and general physical examination), body sign of bite, burn and drug injection and vital signs at the time of admission and treatments used (charcoal therapy and GI lavage) were also recorded.

Statistical analysis

Data were analyzed using version 26 of the Statistical Package for Social Sciences (SPSS Inc., Chicago, IL, USA). Continuous data were expressed as mean (SD) and median with interquartile range (IQR), whereas categorical data were presented as numbers (n) and/ or percentages (%). Chi-square independent/ Fisher's exact test were used to assess associations between categorical variables and studied group. ANOVA test were used for comparing continuous variables.

Results

A total of 4,292 poisoning cases were included in our study during the period of 1 year. The mean (SD) age of study population was 33.07 (14.98) (minimum: 1 , maximum:102) . 52.2% (n=2,242) were male while 47.8% (n=2,050) were female (the male to female ratio was 1:1.09). The most common type of poisoning were drug-related poisonings (47.1%, n=2,020), followed by opioid poisoning (18.4%, n=789), poisoning with multiple substances (13.4%, n=574), stimulants (2.1%, n=91), alcohol (5.2%, n=223), and pesticides (4.9%, n=210). Poisoning with other toxic agents including animal bites, hydrocarbons, gas , heavy metals and etc. were less common (9.0%, n=385).

Descriptive information and past history of the poisoned patients based on type of poisoning is summarised in table 1. Regarding marital status, the majority of patients were single (51.2%, n=2,170), followed by married individuals (46.5%, n=1,970). A smaller proportion being divorced (1.9%, n=82) or widowed (0.4%, n=18). 43.5% had an education level below a diploma (n=1,656), 38.4% (n=1,464) had obtained a diploma, 13.6% (n=519) had received higher education. The most common route of exposure was oral ingestion, accounting for 89.5% (n=3,802) of cases, followed by dermal exposure (2.1%, n=89) and inhalation (2.0%, n=84). With regard to the intention behind poisoning, the majority of cases (78.4%, n=3,319) were intentional, while 20.2% (n=857) were accidental, and 1.4% (n=60) involved poisonings caused by others. Past medical history was reported in 22.0% of cases(n=945) and 29.0% (n=1,243) had a past history of drug use. Additionally, 28.1% (n=1,208) of

..... individuals had a history of psychiatric disease, and 17.7% (n=760) had undergone psychiatric treatment. A prior history of suicide attempts was found in 22.7% (n=975) of cases. 70.7% of them were with poisoning (n=689, not mentioned in the table). Family history of suicide among first-degree relatives was reported in 3.8% (n=164) of cases. A history of criminal offenses was present in 4.4% (n=187) of individuals. Additionally, 7.9% (n=339) reported a history of self-harm.

There was a significant difference between studied group in terms of gender, marital status, level of education, route of exposure, type of exposure, past medical and drug history, psychiatric disease history, being under psychiatric treatment, suicide history, suicide family history, history of criminal record and self-harm ($P < 0.001$). Women constituted the majority of patients with drug poisoning, while men accounted for the majority in other categories. Drugs, stimulants, alcohol and multiple substance poisoning more commonly affected single individuals whereas opioid and pesticide poisoning were more common among married individuals. Except for drug poisoning, which was more observed among individuals with education at the diploma level, other types of poisoning were more common among those with education below the diploma level. The proportion of drug and alcohol poisoning was higher among college-educated individuals compared to other groups. The primary route of exposure was oral across all groups. However, inhalation was higher in stimulant poisoning (35.2%). Intentional poisoning was the most common type of exposure, especially among drug poisoning (94.1%), whereas accidental poisoning was highest among alcohol poisoning cases (57.0%). Majority of poisonings caused by others was occurred with drugs (N=60) and alcohol (N=18). Higher proportion of past medical history was observed among patients with opioid and drug poisoning, respectively. Similarly patients with drug poisoning were more under psychiatric treatment than other groups. Suicide history and family history had a higher proportion among patients with multiple substance poisoning. criminal record history was highest in proportion in stimulant poisoning (19.8%), multiple substances (8.9%) and opioid poisoning (8.1%).

Table 10. Demographic characteristics and past history of patients with acute poisoning by type of toxic agent

	Variable	Total N=4292	Drug N=2,020	Opioid N=789	Stimulant N=91	Alcohol N=223	Pesticide N=210	Multiple Substance N=574	Others N=385	P- value
Gender	Male	2242 (52.2%)	634 (31.4%)	605 (76.7%)	78 (85.7%)	169 (75.8%)	123 (58.6%)	404 (70.4%)	229 (59.5%)	<0.001
	Female	2050 (47.8%)	1386 (68.6%)	184 (23.3%)	13 (14.3%)	54 (24.2%)	87 (41.4%)	170 (29.6%)	156 (40.5%)	
Marital Status	Single	2170 (51.2%)	1046 (52.2%)	306 (39.2%)	52 (58.4%)	157 (71.7%)	87 (42.4%)	347 (61.4%)	175 (46.4%)	<0.001
	Married	1970 (46.5%)	923 (46.0%)	449 (57.6%)	33 (37.1%)	59 (26.9%)	116 (56.6%)	193 (34.2%)	197 (52.3%)	
	Divorced	82 (1.9%)	30 (1.5%)	17 (2.2%)	3 (3.4%)	3 (1.4%)	1 (0.5%)	23 (4.1%)	5 (1.3%)	
	Widow	18 (0.4%)	6 (0.3%)	8 (1.0%)	1 (1.1%)	0 (0.0%)	1 (0.5%)	2 (0.4%)	0 (0.0%)	
Level of education	Illiterate	170 (4.5%)	45 (2.4%)	59 (8.4%)	4 (6.0%)	4 (2.1%)	17 (8.8%)	15 (3.0%)	26 (8.5%)	<0.001



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Under Diploma	1656 (43.5%)	724 (39.2%)	355 (50.6%)	35 (52.2%)	84 (44.7%)	107 (55.2%)	227 (45.0%)	124 (40.4%)	
Diploma	1464 (38.4%)	747 (40.4%)	230 (32.8%)	24 (35.8%)	70 (37.2%)	59 (30.4%)	206 (40.8%)	128 (41.7%)	
College education	519 (13.6%)	331 (17.9%)	57 (8.1%)	4 (6.0%)	30 (16.0%)	11 (5.7%)	57 (11.3%)	29 (9.4%)	
Route of Exposure	Oral	3802 (89.5%)	1998 (99.2%)	706 (89.9%)	45 (49.5%)	223 (100.0%)	198 (94.3%)	489 (85.2%)	143 (41.0%)
	Inhalation	84 (2.0%)	0 (0.0%)	22 (2.8%)	32 (35.2%)	0 (0.0%)	4 (1.9%)	5 (0.9%)	21 (6.0%)
	Injection	20 (0.5%)	7 (0.3%)	5 (0.6%)	1 (1.1%)	0 (0.0%)	4 (1.9%)	1 (0.2%)	2 (0.6%)
	Dermal	89 (2.1%)	0 (0.0%)	1 (0.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	88 (25.2%)
	Multiple Exposure	98 (2.3%)	4 (0.2%)	20 (2.5%)	1 (1.1%)	0 (0.0%)	2 (1.0%)	68 (11.8%)	3 (0.9%)
	Unknown	153 (3.6%)	4 (0.2%)	20 (2.5%)	1 (1.1%)	0 (0.0%)	2 (1.0%)	68 (11.8%)	3 (0.9%)
Type of exposure	Intentional	3319 (78.4%)	1894 (94.1%)	476 (60.8%)	62 (68.1%)	88 (39.5%)	183 (87.6%)	454 (79.2%)	162 (47.1%)
	Accidental	857 (20.2%)	110 (5.5%)	289 (36.9%)	25 (27.5%)	127 (57.0%)	26 (12.4%)	109 (19.0%)	171 (49.7%)
	Induced	60 (1.4%)	9 (0.4%)	18 (2.3%)	4 (4.4%)	8 (3.6%)	0 (0.0%)	10 (1.7%)	11 (3.2%)
Past medical history	Yes	945 (22.0%)	442 (21.9%)	235 (29.8%)	9 (9.9%)	36 (16.1%)	39 (18.6%)	124 (21.6%)	60 (15.6%)
	No	3347 (78.0%)	1578 (78.1%)	554 (70.2%)	82 (90.1%)	187 (83.9%)	171 (81.4%)	450 (78.4%)	325 (84.4%)
Psychiatric Disease History	Yes	1208 (28.1%)	711 (35.2%)	152 (19.3%)	13 (14.3%)	28 (12.6%)	38 (18.1%)	209 (36.4%)	57 (14.8%)
	No	3084 (71.9%)	1309 (64.8%)	637 (80.7%)	78 (85.7%)	195 (87.4%)	172 (81.9%)	365 (63.6%)	328 (85.2%)
Under Psychiatric Treatment	Yes	760 (17.7%)	484 (24.0%)	84 (10.6%)	9 (9.9%)	17 (7.6%)	20 (9.5%)	111 (19.3%)	35 (9.1%)
	No	3532 (82.3%)	1536 (76.0%)	705 (89.4%)	82 (90.1%)	206 (92.4%)	190 (90.5%)	463 (80.7%)	350 (90.9%)
Suicide History	Yes	975 (22.7%)	572 (28.3%)	105 (13.3%)	11 (12.1%)	17 (7.6%)	52 (24.8%)	184 (32.1%)	34 (8.8%)
	No	3317 (77.3%)	1448 (71.7%)	684 (86.7%)	80 (87.9%)	206 (92.4%)	158 (75.2%)	390 (67.9%)	351 (91.2%)
Type of past suicide	Poisoning	689 (70.8%)	413 (74.0%)	72 (70.6%)	9 (81.8%)	11 (64.7%)	33 (63.5%)	127 (71.8%)	24 (70.6%)
	Others	286 (29.3%)	145 (26.0%)	30 (29.4%)	2 (18.2%)	6 (35.3%)	19 (36.5%)	50 (28.2%)	10 (29.4%)
	Yes	164 (3.8%)	99 (4.9%)	16 (2.0%)	1 (1.1%)	4 (1.8%)	6 (2.9%)	32 (5.6%)	6 (1.6%)

شماره:

Suicide Family History	No	4128 (96.2%)	1921 (95.1%)	773 (98.0%)	90 (98.9%)	219 (98.2%)	204 (97.1%)	542 (94.4%)	379 (98.4%)	
Criminal Record history	Yes	187 (4.4%)	31 (1.5%)	64 (8.1%)	18 (19.8%)	3 (1.3%)	7 (3.3%)	51 (8.9%)	13 (3.4%)	<0.001
	No	4105 (95.6%)	1989 (98.5%)	725 (91.9%)	73 (80.2%)	220 (98.7%)	203 (96.7%)	523 (91.1%)	372 (96.6%)	
Self-Harm history	Yes	339 (7.9%)	172 (8.5%)	46 (5.8%)	9 (9.9%)	10 (4.5%)	13 (6.2%)	76 (13.2%)	13 (3.4%)	<0.001
	No	3953 (92.1%)	1848 (91.5%)	743 (94.2%)	82 (90.1%)	213 (95.5%)	197 (93.8%)	498 (86.8%)	372 (96.6%)	
Past Drug History	Yes	1243 (29.0%)	653 (32.3%)	233 (29.5%)	17 (18.7%)	35 (15.7%)	41 (19.5%)	180 (31.4%)	84 (21.8%)	<0.001
	No	3049 (71.0%)	1367 (67.7%)	556 (70.5%)	74 (81.3%)	188 (84.3%)	169 (80.5%)	394 (68.6%)	301 (78.2%)	

Table 2 displays physical examination upon admission, treatment and outcome based in type of poisoning. There was a significant difference in terms of level of consciousness, SBP, PR, RR, pupillary reflex, pharyngeal examination, lung sound, nausea and vomiting, diarrhea, abdominal pain, lavage, charcoal therapy, CPR, intubation, ICU admission and outcome ($P < 0.05$).

A majority of patients across all studied group presented with normal consciousness levels, ranging from 82.1% in drug poisoning cases to 69.6% in other poisoning group. The proportion of comatose status was higher in opioid (2.0%) poisoned patients. Patients with stimulant poisoning showed the highest mean systolic BP (127.17 (17.498) mmHg). Similarly, mean (SD) pulse rate (101.22 bpm) and respiratory rate (18.91 (8.189) breaths/min) was higher in stimulant poisoning cases. In contrast patients with opioid poisoning showed the lowest mean RR (16.91 (7.532) breaths/min). The most frequently observed symptom was nausea and vomiting (21.4%). 57.3% of patients received charcoal therapy and 34.8% underwent lavage.

CRP was performed for 0.8% of patients. Majority were in opioid poisoning group ($n=10$). 4.4% of patients were intubated ($n=189$), the highest proportion was observed among patients with stimulant poisoning. 8.5% of patients required ICU admission. The highest proportion were among the patients with pesticide poisoning. Thirty-three patients died (0.8%). Pesticides (3.9%) accounted for the highest proportion followed by opioids (1.4%).

Table 11. Physical examination, management and outcome of patients with acute poisoning by type of toxic agent

	Variable	Drug	Opioid	Stimulant	Alcohol	Pesticide	Multiple Substance	Others	P-value
Consciousness Level	Normal	1647 (82.1%)	560 (71.2%)	65 (71.4%)	165 (75.3%)	185 (89.8%)	396 (70.1%)	243 (69.6%)	<0.001
	Confusion/Delirium	103 (5.1%)	67 (8.5%)	15 (16.5%)	14 (6.4%)	10 (4.9%)	51 (9.0%)	72 (20.6%)	
	Lethargy	117 (5.8%)	79 (10.1%)	4 (4.4%)	13 (5.9%)	3 (1.5%)	42 (7.4%)	34 (9.7%)	
	Obtundation	43 (2.1%)	23 (2.9%)	1 (1.1%)	6 (2.7%)	1 (0.5%)	16 (2.8%)	0 (0.0%)	
	Stupor	65 (3.2%)	41 (5.2%)	2 (2.2%)	16 (7.3%)	5 (2.4%)	38 (6.7%)	4 (1.0%)	



معاونت پژوهشی و فناوری
استان آذربایجان شرقی

شماره:

Coma	32 (1.6%)	16 (2.0%)	4 (4.4%)	5 (2.3%)	2 (1.0%)	22 (3.9%)	0 (0.0%)	
SBP	Mean (SD)	121.94 (17.285)	122.48 (19.620)	127.17 (17.498)	125.72 (20.116)	124.28 (17.931)	121.74 (18.388)	125.01 (18.535)
DBP	Mean (SD)	77.33 (12.241)	77.02 (13.492)	80.97 (12.398)	78.06 (13.935)	77.69 (12.069)	76.59 (13.561)	78.23 (12.746)
PR	Mean (SD)	88.19 (21.980)	91.82 (18.419)	101.22 (20.476)	92.09 (17.466)	90.08 (15.078)	91.28 (46.256)	87.92 (16.981)
RR	Mean (SD)/ breaths/min	17.81 (6.446)	16.91 (7.532)	18.91 (8.189)	18.77 (12.664)	18.23 (6.723)	17.19 (6.236)	17.65 (4.523)
Pupillary Reflex	Yes	2016 (99.8%)	783 (99.2%)	89 (97.8%)	223 (100.0 %)	209 (99.5%)	568 (99.0%)	385 (100.0%)
	No	4 (0.2%)	6 (0.8%)	2 (2.2%)	0 (0.0%)	1 (0.5%)	6 (1.0%)	0 (0.0%)
Nystagmus	Yes	3 (0.1%)	0 (0.0%)	0 (0.0%)	1 (0.4%)	0 (0.0%)	4 (0.7%)	0 (0.0%)
	No	2017 (99.9%)	789 (100.0 %)	91 (100.0%)	222 (99.6%)	210 (100.0%)	570 (99.3%)	385 (100.0%)
Body Sign of Bite	Yes	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.3%)	58 (15.1%)
	No	2020 (100.0 %)	789 (100.0 %)	91 (100.0%)	223 (100.0 %)	210 (100.0%)	572 (99.7%)	327 (84.9%)
Body Sign of Burn	Yes	28 (1.4%)	11 (1.4%)	1 (1.1%)	1 (0.4%)	0 (0.0%)	7 (1.2%)	5 (1.3%)
	No	1992 (98.6%)	778 (98.6%)	90 (98.9%)	222 (99.6%)	210 (100.0%)	567 (98.8%)	380 (98.7%)
Body Sign of Drug injection	Yes	14 (0.7%)	22 (2.8%)	6 (6.6%)	0 (0.0%)	3 (1.4%)	15 (2.6%)	3 (0.8%)
	No	2006 (99.3%)	767 (97.2%)	85 (93.4%)	223 (100.0 %)	207 (98.6%)	559 (97.4%)	382 (99.2%)
Pharyngeal Examination	Abnormal	9 (0.4%)	4 (0.5%)	3 (3.3%)	0 (0.0%)	8 (3.8%)	6 (1.0%)	4 (1.0%)
	Normal	2011 (99.6%)	785 (99.5%)	88 (96.7%)	223 (100.0 %)	202 (96.2%)	568 (99.0%)	381 (99.0%)
Heart Sound	Abnormal	141 (7.0%)	81 (10.3%)	15 (16.5%)	21 (9.4%)	17 (8.1%)	46 (8.0%)	25 (6.5%)
	Normal	1879 (93.0%)	708 (89.7%)	76 (83.5%)	202 (90.6%)	193 (91.9%)	528 (92.0%)	360 (93.5%)
Lung Sound	Abnormal	9 (0.4%)	45 (5.7%)	4 (4.4%)	2 (0.9%)	4 (1.9%)	21 (3.7%)	16 (4.2%)
	Normal	2011 (99.6%)	744 (94.3%)	87 (95.6%)	221 (99.1%)	206 (98.1%)	553 (96.3%)	369 (95.8%)
Bowel Sound	Abnormal	2 (0.1%)	2 (0.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.3%)	1 (0.3%)



معاونت پژوهشی و فناوری
پزشکی دانشگاه تبریز

شماره:

تاریخ:	Normal	2018 (99.9%)	787 (99.7%)	91 (100.0%)	223 (100.0%)	210 (100.0%)	572 (99.7%)	384 (99.7%)	
پیرست:									
Nausea/Vomiting	Yes	456 (22.6%)	136 (17.2%)	15 (16.5%)	68 (30.5%)	85 (40.5%)	100 (17.4%)	58 (15.1%)	<0.001
	No	1564 (77.4%)	653 (82.8%)	76 (83.5%)	155 (69.5%)	125 (59.5%)	474 (82.6%)	327 (84.9%)	
Diarrhea	Yes	33 (1.6%)	5 (0.6%)	0 (0.0%)	2 (0.9%)	8 (3.8%)	9 (1.6%)	4 (1.0%)	0.021
	No	1987 (98.4%)	784 (99.4%)	91 (100.0%)	221 (99.1%)	202 (96.2%)	565 (98.4%)	381 (99.0%)	
Abdominal Pain	Yes	135 (6.7%)	33 (4.2%)	8 (8.8%)	22 (9.9%)	25 (11.9%)	25 (4.4%)	17 (4.4%)	<0.001
	No	1885 (93.3%)	756 (95.8%)	83 (91.2%)	201 (90.1%)	185 (88.1%)	549 (95.6%)	368 (95.6%)	
Neurologic Examination	Abnormal	11 (0.5%)	3 (0.4%)	2 (2.2%)	3 (1.3%)	1 (0.5%)	3 (0.5%)	1 (0.3%)	0.24
	Normal	2009 (99.5%)	786 (99.6%)	89 (97.8%)	220 (98.7%)	209 (99.5%)	571 (99.5%)	384 (99.7%)	
Reflex of Extremity	Asymmetric	1 (0.0%)	1 (0.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.2%)	0 (0.0%)	0.92
	Symmetric	2019 (100.0%)	788 (99.9%)	91 (100.0%)	223 (100.0%)	210 (100.0%)	573 (99.8%)	385 (100.0%)	
Muscle Force	Asymmetric	5 (0.2%)	4 (0.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (0.5%)	3 (0.8%)	0.48
	Symmetric	2015 (99.8%)	785 (99.5%)	91 (100.0%)	223 (100.0%)	210 (100.0%)	571 (99.5%)	382 (99.2%)	
DTR	Hyperreflexia	6 (0.3%)	5 (0.6%)	0 (0.0%)	1 (0.4%)	0 (0.0%)	2 (0.3%)	1 (0.3%)	0.93
	Normal	1977 (97.9%)	773 (98.0%)	89 (97.8%)	218 (97.8%)	208 (99.0%)	559 (97.4%)	376 (97.7%)	
	Hyporeflexia	37 (1.8%)	11 (1.4%)	2 (2.2%)	4 (1.8%)	2 (1.0%)	13 (2.3%)	8 (2.1%)	
Plantar Reflex	Extension	43 (2.1%)	10 (1.3%)	4 (4.4%)	2 (0.9%)	4 (1.9%)	12 (2.1%)	4 (1.0%)	0.34
	Mute	54 (2.7%)	24 (3.0%)	2 (2.2%)	9 (4.0%)	2 (1.0%)	16 (2.8%)	14 (3.6%)	
	Flexion	1923 (95.2%)	755 (95.7%)	85 (93.4%)	212 (95.1%)	204 (97.1%)	546 (95.1%)	367 (95.3%)	
Trauma After Poisoning	Yes	25 (1.2%)	16 (2.0%)	3 (3.3%)	3 (1.3%)	2 (1.0%)	9 (1.6%)	5 (1.3%)	0.53
	No	1995 (98.8%)	773 (98.0%)	88 (96.7%)	220 (98.7%)	208 (99.0%)	565 (98.4%)	380 (98.7%)	
Lavage	Yes	1033 (51.6%)	106 (13.7%)	13 (14.6%)	14 (6.3%)	113 (54.3%)	165 (29.0%)	51 (14.6%)	<0.001
	No	968 (48.4%)	667 (86.3%)	76 (85.4%)	207 (93.7%)	95 (45.7%)	404 (71.0%)	298 (85.4%)	
Charcoal Therapy	Yes	1683 (84.1%)	237 (30.7%)	20 (22.5%)	11 (5.0%)	134 (64.4%)	286 (50.3%)	93 (26.6%)	<0.001

CPR	No	318 (15.9%)	536 (69.3%)	69 (77.5%)	210 (95.0%)	74 (35.6%)	283 (49.7%)	256 (73.4%)	<0.001
	Yes	6 (0.3%)	10 (1.3%)	1 (1.1%)	2 (0.9%)	8 (3.8%)	5 (0.9%)	4 (1.0%)	
	No	2014 (99.7%)	779 (98.7%)	90 (98.9%)	221 (99.1%)	202 (96.2%)	569 (99.1%)	381 (99.0%)	
Intubation	Yes	62 (3.1%)	38 (4.8%)	8 (8.8%)	12 (5.4%)	6 (2.9%)	42 (7.3%)	21 (5.5%)	<0.001
	No	1958 (96.9%)	751 (95.2%)	83 (91.2%)	211 (94.6%)	204 (97.1%)	532 (92.7%)	364 (94.5%)	
Mean duration of hospitalization		33.88 (70.274)	47.81 (74.356)	30.18 (40.041)	31.02 (57.005)	48.14 (80.548)	42.14 (75.505)	48.48 (109.325)	<0.001
Hospitalization	ICU	1 (0.0%)	1 (0.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.2%)	0 (0.0%)	<0.001
	Ward	1906 (94.4%)	702 (89.0%)	77 (84.6%)	207 (92.8%)	179 (85.2%)	508 (88.5%)	350 (90.9%)	
	Both	113 (5.6%)	86 (10.9%)	14 (15.4%)	16 (7.2%)	31 (14.8%)	65 (11.3%)	35 (9.1%)	
ICU admission	Yes	114 (5.6%)	87 (11.0%)	14 (15.4%)	16 (7.2%)	31 (14.8%)	66 (11.5%)	35 (9.1%)	<0.001
	No	1906 (94.4%)	702 (89.0%)	77 (84.6%)	207 (92.8%)	179 (85.2%)	508 (88.5%)	350 (90.9%)	
Outcome	Recovery	1779 (99.7%)	716 (98.6%)	82 (98.8%)	214 (99.1%)	174 (96.1%)	498 (99.0%)	357 (99.2%)	<0.001
	Mortality	5 (0.3%)	10 (1.4%)	1 (1.2%)	2 (0.9%)	7 (3.9%)	5 (1.0%)	3 (0.8%)	

Descriptive information and past history of the patients based on gender are summarised in table 3. The majority of both gender were between 20-40 years old. A higher proportion of females (26.1%) were under 20 years old compared to males (14.5%). Conversely, males had a higher percentage in the 41-65 age group (28.0%) and ≥ 65 years group (5.8%) than females. Males had a significantly higher proportion of single cases (54.2%), whereas females were more likely to be married (49.0%). The majority of both gender had education below a diploma. Females were more likely to have college education (17.8%) compared to males (9.7%). Males had a higher proportion of education below a diploma (46.8% vs. 39.9%).

Medications were the most common cause of poisoning in both groups, followed by opioids and multiple substances. However, the prevalence of drug poisoning was twice as high in women compared to men, while the prevalence of opioid and multiple substance poisoning was three times higher in men than in women. Intentional poisoning was more common among females, whereas males had a higher percentage of accidental poisoning (88.3% vs 28.9%, $P < 0.05$). Psychiatric disease history (29.6% vs. 26.8%) and psychiatric treatment (19.1% vs. 16.4%) were more common in females compared to males ($P < 0.05$). Similarly, previous suicide attempts (28.8% vs. 7.2%) and a family history of suicide (4.9% vs. 2.8%) were also more frequent among females ($P < 0.05$). In contrast, males exhibited significantly higher rates of criminal records (7.6% vs. 0.8%) and addiction history (62.0% vs. 20%) compared to females ($P < 0.05$).



پژوهشی و فناوری
معاونت پژوهشی و فناوری

شماره:

Table 12. Demographic characteristics and past history of patients with acute poisoning by gender

پایه:	Variable	Total	Female	Male	P-value
Age	<20	858 (20.1%)	533 (26.1%)	325 (14.5%)	<0.001
	20-40	2297 (53.7%)	1142 (56.0%)	1155 (51.7%)	
	41-65	940 (22.0%)	313 (15.3%)	627 (28.0%)	
	>=65	181 (4.2%)	52 (2.5%)	129 (5.8%)	
Marital Status	Single	2170 (51.2%)	974 (47.9%)	1196 (54.2%)	<0.001
	Married	1970 (46.5%)	997 (49.0%)	973 (44.1%)	
	Divorced	82 (1.9%)	53 (2.6%)	29 (1.3%)	
	Widow	18 (0.4%)	10 (0.5%)	8 (0.4%)	
Level of education	Illiterate	170 (4.5%)	74 (4.0%)	96 (4.9%)	<0.001
	Under Diploma	1656 (43.5%)	742 (39.9%)	914 (46.8%)	
	Diploma	1464 (38.4%)	712 (38.3%)	752 (38.5%)	
	College Education	519 (13.6%)	330 (17.8%)	189 (9.7%)	
Type of Poisoning	Medications	2020 (47.1%)	1386 (67.6%)	634 (28.3%)	<0.001
	Opioids	789 (18.4%)	184 (9.0%)	605 (27.0%)	
	Stimulants	91 (2.1%)	13 (0.6%)	78 (3.5%)	
	Alcohol	223 (5.2%)	54 (2.6%)	169 (7.5%)	
	Pesticides	210 (4.9%)	87 (4.2%)	123 (5.5%)	
	Multiple Substance Toxicity	574 (13.4%)	170 (8.3%)	404 (18.0%)	
	Others	238 (5.5%)	156 (7.6%)	229 (10.2%)	
Route of Exposure	Oral	3802 (89.5%)	1918 (94.3%)	1884 (85.1%)	<0.001
	Inhalation	84 (2.0%)	25 (1.2%)	59 (2.7%)	
	Injection	20 (0.5%)	10 (0.5%)	10 (0.5%)	
	Dermal	89 (2.1%)	33 (1.6%)	56 (2.5%)	
	Multiple Exposure	98 (2.3%)	13 (0.6%)	85 (3.8%)	
	Unknown	153 (3.6%)	34 (1.7%)	119 (5.4%)	
Type of exposure	Intentional	3319 (78.4%)	1793 (88.3%)	1526 (69.2%)	<0.001
	Accidental	857 (20.2%)	220 (10.8%)	637 (28.9%)	
	Caused by other	60 (1.4%)	17 (0.8%)	43 (1.9%)	
Past medical history	Yes	945 (22.0%)	459 (22.4%)	486 (21.7%)	0.57
	No	3347 (78.0%)	1591 (77.6%)	1756 (78.3%)	
Psychiatric Disease history	Yes	1208 (28.1%)	607 (29.6%)	601 (26.8%)	0.041
	No	3084 (71.9%)	1443 (70.4%)	1641 (73.2%)	

شماره:

Under Psychiatric treatment	Yes	760 (17.7%)	392 (19.1%)	368 (16.4%)	0.020
	No	3532 (82.3%)	1658 (80.9%)	1874 (83.6%)	
Suicide History	Yes	975 (22.7%)	590 (28.8%)	385 (17.2%)	<0.001
	No	3317 (77.3%)	1460 (71.2%)	1857 (82.8%)	
Type of Past Suicide	Poisoning	689 (72.5%)	420 (72.5%)	269 (72.3%)	0.94
	Others	262 (27.5%)	159 (27.5%)	103 (27.7%)	
Suicide Family History	Yes	164 (3.8%)	101 (4.9%)	63 (2.8%)	<0.001
	No	4128 (96.2%)	1949 (95.1%)	2179 (97.2%)	
Self-Harm History	Yes	339 (7.9%)	169 (8.2%)	170 (7.6%)	0.42
	No	3953 (92.1%)	1881 (91.8%)	2072 (92.4%)	
Criminal Record History	Yes	187 (4.4%)	17 (0.8%)	170 (7.6%)	<0.001
	No	4105 (95.6%)	2033 (99.2%)	2072 (92.4%)	
Addiction History	Yes	1815 (42.3%)	425 (20.7%)	1390 (62.0%)	<0.001
	No	2477 (57.7%)	1625 (79.3%)	852 (38.0%)	

Table 4 displays physical examination, management and outcome of patients used on gender. There was a significant difference in terms of level of consciousness, nystagmus, heart and lung sound, nausea and vomiting, diarrhea, abdominal pain between gender ($P < 0.05$). Males had a significantly higher rate of intubation (5.6%) than females (3.1%) ($p < 0.001$). CPR was more commonly required in males (1.2%) compared to females (0.4%) ($p = 0.006$). The mortality rate was significantly higher among males compared to females (1.3% vs. 0.3%, $P < 0.05$).

Table 13. Physical examination, management and outcome of patients with acute poisoning by gender

	Clinical Variables	Total	Female	Male	P-value
Level of Consciousness	Normal	3275 (77.6%)	1698 (83.9%)	1577 (71.5%)	<0.001
	Confusion/Delirium	280 (6.6%)	92 (4.5%)	188 (8.5%)	
	Lethargy	278 (6.6%)	108 (5.3%)	170 (7.7%)	
	Obtundation	105 (2.5%)	37 (1.8%)	68 (3.1%)	
	Stupor	197 (4.7%)	64 (3.2%)	133 (6.0%)	
	Coma	94 (2.2%)	24 (1.2%)	70 (3.2%)	
Pupillary Reflex	Yes	4273 (99.6%)	2045 (99.8%)	2228 (99.4%)	0.061
	No	19 (0.4%)	5 (0.2%)	14 (0.6%)	
Nystagmus	Yes	8 (0.2%)	7 (0.3%)	1 (0.0%)	0.026
	No	4284 (99.8%)	2043 (99.7%)	2241 (100.0%)	

شماره:

Body Sign of Bite	Yes	60 (1.4%)	23 (1.1%)	37 (1.7%)	0.14
	No	4232 (98.6%)	2027 (98.9%)	2205 (98.3%)	
Body Sign of Burn	Yes	53 (1.2%)	26 (1.3%)	27 (1.2%)	0.48
	No	4239 (98.8%)	2024 (98.7%)	2215 (98.8%)	
Body Sign of Drugs	Yes	63 (1.5%)	15 (0.7%)	48 (2.1%)	<0.001
	No	4229 (98.5%)	2035 (99.3%)	2194 (97.9%)	
Heart Sound	Abnormal	346 (8.1%)	141 (6.9%)	205 (9.1%)	0.006
	Normal	3946 (91.9%)	1909 (93.1%)	2037 (90.9%)	
Lung Sound	Abnormal	101 (2.4%)	16 (0.8%)	85 (3.8%)	<0.001
	Normal	4191 (97.6%)	2034 (99.2%)	2157 (96.2%)	
Bowel Sound	Abnormal	7 (0.2%)	2 (0.1%)	5 (0.2%)	0.27
	Normal	4285 (99.8%)	2048 (99.9%)	2237 (99.8%)	
Nausea/Vomiting	Yes	918 (21.4%)	556 (27.1%)	362 (16.1%)	<0.001
	No	3374 (78.6%)	1494 (72.9%)	1880 (83.9%)	
Diarrhea	Yes	61 (1.4%)	39 (1.9%)	22 (1.0%)	0.011
	No	4231 (98.6%)	2011 (98.1%)	2220 (99.0%)	
Abdominal Pain	Yes	265 (6.2%)	153 (7.5%)	112 (5.0%)	0.001
	No	4027 (93.8%)	1897 (92.5%)	2130 (95.0%)	
Neurologic Examination	Abnormal	24 (0.6%)	14 (0.7%)	10 (0.4%)	0.30
	Normal	4268 (99.4%)	2036 (99.3%)	2232 (99.6%)	
Reflex of Extremity	Symmetric	4289 (99.9%)	2049 (100.0%)	2240 (99.9%)	0.53
	Asymmetric	15 (0.3%)	8 (0.4%)	7 (0.3%)	
DTR	Hyperreflexia	15 (0.3%)	12 (0.6%)	3 (0.1%)	0.018
	Normal	4200 (97.9%)	2007 (97.9%)	2193 (97.8%)	
	Hyporeflexia	77 (1.8%)	31 (1.5%)	46 (2.1%)	
Plantar Reflex	Extension	79 (1.8%)	35 (1.7%)	44 (2.0%)	0.55
	Mute	121 (2.8%)	53 (2.6%)	68 (3.0%)	
	Flexion	4092 (95.3%)	1962 (95.7%)	2130 (95.0%)	
Trauma After Poisoning	Yes	63 (1.5%)	26 (1.3%)	37 (1.7%)	0.18
	No	4229 (98.5%)	2024 (98.7%)	2205 (98.3%)	
Pupil	Normal	2924 (70.6%)	1597 (80.1%)	1327 (61.8%)	<0.001
	Miosis	843 (20.4%)	215 (10.8%)	628 (29.3%)	
	Mydriasis	374 (9.0%)	183 (9.2%)	191 (8.9%)	
Charcoal	Charcoal	2464 (58.5%)	1487 (73.6%)	977 (44.6%)	<0.001

شماره:

تاریخ:	Other Treatment	1746 (41.5%)	534 (26.4%)	1212 (55.4%)	
پیوست: Lavage	Lavage	1495 (35.5%)	908 (44.9%)	587 (26.8%)	<0.001
	Other Treatment	2715 (64.5%)	1113 (55.1%)	1602 (73.2%)	
Intubation	Yes	189 (4.4%)	64 (3.1%)	125 (5.6%)	<0.001
	No	4103 (95.6%)	1986 (96.9%)	2117 (94.4%)	
CPR	Yes	36 (0.8%)	9 (0.4%)	27 (1.2%)	0.006
	No	4256 (99.2%)	2041 (99.6%)	2215 (98.8%)	
Type of hospitalization	ICU	3 (0.1%)	1 (0.0%)	2 (0.1%)	<0.001
	Ward	3929 (91.5%)	1931 (94.2%)	1998 (89.1%)	
	Both	360 (8.4%)	118 (5.8%)	242 (10.8%)	
ICU admission	Yes	363 (8.5%)	119 (5.8%)	244 (10.9%)	<0.001
	No	3929 (91.5%)	1931 (94.2%)	1998 (89.1%)	
Outcome	Recovery	3820 (99.1%)	1809 (99.7%)	2011 (98.7%)	0.001
	Mortality	33 (0.9%)	6 (0.3%)	27 1.3%)	

Descriptive information and past history of the patients based on age categories are summarised in table 5. Except for suicide family history significant differences were observed among demographics and past history of patients in different age groups ($P < 0.05$). Drug poisoning (47.1%) was the most frequent poisoning across all age groups, particularly in younger individuals (< 20 years: 59.8%). Opioid poisoning increased with age, being most common in the ≥ 65 years group (54.7%). Stimulant, alcohol and multiple substance poisoning were primarily observed in the younger and middle-aged groups (20-40 years: 5.8%), while pesticide poisoning had a relatively even distribution across all age groups ($p < 0.001$). Suicidal intent was the most common type of exposure across all age groups, particularly among individuals aged < 20 years (83.9%) and 20-40 years (82.5%). In contrast accidental poisoning was more prevalent among older adults (≥ 65 years: 45.3%)

A past medical history was most frequently reported among older adults aged 65 years and above (56.9%). Psychiatric illness history had highest proportion in the 41-65 years group (30.3%). Suicide attempts were significantly more common among younger patients aged 20-40 years (25.0%). Criminal history was most frequently observed in the 41-65 years age group (5.7%). Addiction history was most prevalent in the ≥ 65 years group (54.7%).

Table 14. Demographic characteristics and past history of patients with acute poisoning based on age categories

	Variable	Total	<20	20-40	41-65	≥ 65	P-value
Gender	Female	2040 (47.7%)	533 (62.1%)	1142 (49.7%)	313 (33.3%)	52 (28.7%)	<0.001
	Male	2236 (52.3%)	325 (37.9%)	1155 (50.3%)	627 (66.7%)	129 (71.3%)	

شماره:

Marital Status تاریخ پیوست:	Single	2165 (51.3%)	807 (94.8%)	1187 (52.3%)	158 (17.1%)	13 (7.2%)	<0.001
	Married	1959 (46.4%)	43 (5.1%)	1029 (45.4%)	732 (79.3%)	155 (85.6%)	
	Divorced	82 (1.9%)	1 (0.1%)	51 (2.2%)	29 (3.1%)	1 (0.6%)	
	Widow	18 (0.4%)	0 (0.0%)	2 (0.1%)	4 (0.4%)	12 (6.6%)	
Level of education	Illiterate	169 (4.5%)	37 (4.7%)	49 (2.4%)	47 (5.8%)	36 (24.0%)	<0.001
	Under Diploma	1651 (43.5%)	537 (67.8%)	664 (32.6%)	385 (47.2%)	65 (43.3%)	
	Diploma	1456 (38.4%)	194 (24.5%)	908 (44.6%)	311 (38.2%)	43 (28.7%)	
	College Education	517 (13.6%)	24 (3.0%)	415 (20.4%)	72 (8.8%)	6 (4.0%)	
Type of Poisoning	Medications	2013 (47.1%)	513 (59.8%)	1139 (49.6%)	320 (34.0%)	41 (22.7%)	<0.001
	Opioids	784 (18.3%)	76 (8.9%)	320 (13.9%)	289 (30.7%)	99 (54.7%)	
	Stimulants	91 (2.1%)	16 (1.9%)	51 (2.2%)	23 (2.4%)	1 (0.6%)	
	Alcohol	222 (5.2%)	53 (6.2%)	134 (5.8%)	33 (3.5%)	2 (1.1%)	
	Pesticides	210 (4.9%)	40 (4.7%)	116 (5.1%)	43 (4.6%)	11 (6.1%)	
	Multiple Substance Toxicity	573 (13.4%)	98 (11.4%)	338 (14.7%)	127 (13.5%)	10 (5.5%)	
	Others	237 (5.5%)	35 (4.1%)	118 (5.1%)	72 (7.7%)	12 (6.6%)	
Route of Exposure	Oral	3788 (89.6%)	792 (93.7%)	2052 (90.0%)	793 (85.5%)	151 (84.4%)	<0.001
	Inhalation	84 (2.0%)	10 (1.2%)	39 (1.7%)	30 (3.2%)	5 (2.8%)	
	Injection	20 (0.5%)	3 (0.4%)	13 (0.6%)	4 (0.4%)	0 (0.0%)	
	Dermal	88 (2.1%)	17 (2.0%)	48 (2.1%)	18 (1.9%)	5 (2.8%)	
	Route of Exposure	98 (2.3%)	8 (0.9%)	56 (2.5%)	29 (3.1%)	5 (2.8%)	
	Unknown	152 (3.6%)	15 (1.8%)	71 (3.1%)	53 (5.7%)	13 (7.3%)	
Past medical history	Yes	944 (22.1%)	114 (13.3%)	393 (17.1%)	334 (35.5%)	103 (56.9%)	<0.001
	No	3332 (77.9%)	744 (86.7%)	1904 (82.9%)	606 (64.5%)	78 (43.1%)	
Type of exposure	Intentional	3306 (78.3%)	708 (83.9%)	1876 (82.5%)	629 (68.1%)	93 (52.0%)	<0.001
	Accidental	854 (20.2%)	123 (14.6%)	371 (16.3%)	279 (30.2%)	81 (45.3%)	
	Caused by other intent	60 (1.4%)	13 (1.5%)	27 (1.2%)	15 (1.6%)	5 (2.8%)	
History of Psychiatric Disease	Yes	1204 (28.2%)	208 (24.2%)	683 (29.7%)	285 (30.3%)	28 (15.5%)	<0.001
	No	3072 (71.8%)	650 (75.8%)	1614 (70.3%)	655 (69.7%)	153 (84.5%)	
Under Psychiatric Treatment	Yes	758 (17.7%)	142 (16.6%)	434 (18.9%)	167 (17.8%)	15 (8.3%)	

شماره:

تاریخ:	No	3518 (82.3%)	716 (83.4%)	1863 (81.1%)	773 (82.2%)	166 (91.7%)	
Suicide History	Yes	974 (22.8%)	194 (22.6%)	575 (25.0%)	191 (20.3%)	14 (7.7%)	<0.001
	No	3302 (77.2%)	664 (77.4%)	1722 (75.0%)	749 (79.7%)	167 (92.3%)	
Suicide Family History	Yes	164 (3.8%)	42 (4.9%)	86 (3.7%)	33 (3.5%)	3 (1.7%)	0.15
	No	4112 (96.2%)	816 (95.1%)	2211 (96.3%)	907 (96.5%)	178 (98.3%)	
Self-Harm History	Yes	338 (7.9%)	97 (11.3%)	194 (8.4%)	43 (4.6%)	4 (2.2%)	<0.001
	No	3938 (92.1%)	761 (88.7%)	2103 (91.6%)	897 (95.4%)	177 (97.8%)	
Criminal Record History	Yes	186 (4.3%)	7 (0.8%)	122 (5.3%)	54 (5.7%)	3 (1.7%)	<0.001
	No	4090 (95.7%)	851 (99.2%)	2175 (94.7%)	886 (94.3%)	178 (98.3%)	
Addiction History	Yes	1810 (42.3%)	209 (24.4%)	985 (42.9%)	517 (55.0%)	99 (54.7%)	<0.001
	No	2466 (57.7%)	649 (75.6%)	1312 (57.1%)	423 (45.0%)	82 (45.3%)	

Table 4 displays physical examination, management and outcome of patients based on age brackets. ICU admission had a highest proportion among 20-40 age group. CPR and intubation was significantly higher in elderly patients (≥ 65 years: 3.9% and 8.8% respectively). Mortality was highest among the elderly (≥ 65 years: 4.2%), whereas it was lowest among patients under 20 years (0.1%)

Table 15. Physical examination, management and outcome of patients with acute poisoning by age categories

	Clinical Variables	Total	<20	20-40	41-65	≥ 65	P-value
Level of Consciousness	Normal	2515 (81.7%)	735 (86.9%)	1780 (78.6%)	549 (61.1%)	100 (57.5%)	<0.001
	Confusion/Delirium	167 (5.4%)	32 (3.8%)	135 (6.0%)	288 (32.0%)	71 (40.8%)	
	Lethargy	173 (5.6%)	36 (4.3%)	137 (6.0%)	62 (6.9%)	3 (1.7%)	
	Obtundation	73 (2.4%)	10 (1.2%)	63 (2.8%)	2 (0.2%)	1 (0.6%)	
	Stupor	122 (4.0%)	25 (3.0%)	97 (4.3%)	21 (2.2%)	2 (1.1%)	
	Coma	62 (2.0%)	8 (0.9%)	54 (2.4%)	33 (3.5%)	10 (5.5%)	
Pupillary Reflex	Yes	3143 (99.7%)	857 (99.9%)	2286 (99.5%)	936 (99.6%)	178 (98.3%)	0.04
	No	12 (0.3%)	1 (0.1%)	11 (0.5%)	4 (0.4%)	3 (1.7%)	
Nystagmus	Yes	8 (0.2%)	1 (0.1%)	7 (0.3%)	0 (0.0%)	0 (0.0%)	0.26
	No	3147 (99.8%)	857 (99.9%)	2290 (99.7%)	940 (100.0%)	181 (100.0%)	
Body Sign of Bite	Yes	45 (1.2%)	11 (1.3%)	34 (1.5%)	11 (1.2%)	3 (1.7%)	0.89



معاونت پژوهشی و فناوری
مرکز تحقیقات سلامت

شماره:

تاریخ:

پیمایش:

	No	3110 (98.8%)	847 (98.7%)	2263 (98.5%)	929 (98.8%)	178 (98.3%)	
Body Sign of Burn	Yes	41 (1.1%)	8 (0.9%)	33 (1.4%)	11 (1.2%)	1 (0.6%)	0.55
	No	3114 (98.9%)	850 (99.1%)	2264 (98.6%)	929 (98.8%)	180 (99.4%)	
Body Sign of Drugs	Yes	43 (1.4%)	4 (0.5%)	39 (1.7%)	18 (1.9%)	2 (1.1%)	0.042
	No	3112 (98.6%)	854 (99.5%)	2258 (98.3%)	922 (98.1%)	179 (98.9%)	
Heart Sound	Abnormal	264 (8.6%)	62 (7.2%)	202 (8.8%)	62 (6.6%)	18 (9.9%)	0.11
	Normal	2891 (91.4%)	796 (92.8%)	2095 (91.2%)	878 (93.4%)	163 (90.1%)	
Lung Sound	Abnormal	49 (1.6%)	8 (0.9%)	41 (1.8%)	38 (4.0%)	14 (7.7%)	<0.001
	Normal	3106 (98.4%)	850 (99.1%)	2256 (98.2%)	902 (96.0%)	167 (92.3%)	
Bowel Sound	Abnormal	4 (0.1%)	1 (0.1%)	3 (0.1%)	2 (0.2%)	1 (0.6%)	0.56
	Normal	3151 (99.9%)	857 (99.9%)	2294 (99.9%)	938 (99.8%)	180 (99.4%)	
Nausea/Vomiting	Yes	745 (23.4%)	244 (28.4%)	501 (21.8%)	145 (15.4%)	24 (13.3%)	<0.001
	No	2410 (76.6%)	614 (71.6%)	1796 (78.2%)	795 (84.6%)	157 (86.7%)	
Diarrhea	Yes	53 (1.7%)	17 (2.0%)	36 (1.6%)	7 (0.7%)	1 (0.6%)	0.098
	No	3102 (98.3%)	841 (98.0%)	2261 (98.4%)	933 (99.3%)	180 (99.4%)	
Abdominal Pain	Yes	220 (6.9%)	77 (9.0%)	143 (6.2%)	39 (4.1%)	5 (2.8%)	<0.001
	No	2935 (93.1%)	781 (91.0%)	2154 (93.8%)	901 (95.9%)	176 (97.2%)	
Neurologic Examination	Abnormal	20 (0.6%)	6 (0.7%)	14 (0.6%)	4 (0.4%)	1 (0.6%)	0.63
	Normal	3135 (99.4%)	852 (99.3%)	2283 (99.4%)	936 (99.6%)	179 (99.4%)	
Reflex of Extremity	Asymmetric	2 (0.1%)	0 (0.0%)	2 (0.1%)	1 (0.1%)	0 (0.0%)	0.80
	Symmetric	3153 (99.9%)	858 (100.0%)	2295 (99.9%)	939 (99.9%)	181 (100.0%)	
Muscle Force	Asymmetric	9 (0.3%)	2 (0.2%)	7 (0.3%)	5 (0.5%)	1 (0.6%)	0.67
	Symmetric	3146 (99.7%)	856 (99.8%)	2290 (99.7%)	935 (99.5%)	180 (99.4%)	
DTR	Hyperreflexia	13 (0.4%)	3 (0.3%)	10 (0.4%)	2 (0.2%)	0 (0.0%)	0.018
	Normal	3098 (98.0%)	847 (98.7%)	2251 (98.0%)	912 (97.0%)	174 (96.1%)	
	Hyporeflexia	44 (1.6%)	8 (0.9%)	36 (1.6%)	26 (2.8%)	7 (3.9%)	
Plantar Reflex	Extension	56 (1.8%)	14 (1.6%)	42 (1.8%)	21 (2.2%)	2 (1.1%)	0.13
	Mute	78 (2.6%)	18 (2.1%)	60 (2.6%)	33 (3.5%)	10 (5.5%)	

	Flexion	3021 (95.6%)	826 (96.3%)	2195 (95.6%)	886 (94.3%)	165 (91.2%)	
Trauma After Poisoning	Yes	45 (1.4%)	11 (1.3%)	34 (1.5%)	16 (1.7%)	1 (0.6%)	0.65
	No	3110 (98.6%)	847 (98.7%)	2263 (98.5%)	924 (98.3%)	180 (99.4%)	
Type of Hospitalization	ICU	1 (0.0%)	0 (0.0%)	1 (0.0%)	2 (0.2%)	0 (0.0%)	<0.001
	Ward	2945 (92.3%)	824 (96.0%)	2121 (92.3%)	825 (87.8%)	144 (79.6%)	
	Both	209 (7.6%)	34 (4.0%)	175 (7.6%)	113 (12.0%)	37 (20.4%)	
Intubation	Yes	118 (4.4%)	17 (2.0%)	101 (4.4%)	54 (5.7%)	16 (8.8%)	<0.001
	No	3037 (95.6%)	841 (98.0%)	2196 (95.6%)	886 (94.3%)	165 (91.2%)	
CPR	Yes	14 (0.5%)	2 (0.2%)	12 (0.5%)	15 (1.6%)	7 (3.9%)	<0.001
	No	3141 (99.5%)	856 (99.8%)	2285 (99.5%)	925 (98.4%)	174 (96.1%)	
Pupil	Normal	2265 (72.0%)	667 (80.1%)	1598 (72.0%)	549 (61.1%)	100 (57.5%)	<0.001
	Miosis	479 (17.7%)	86 (10.3%)	393 (17.7%)	288 (32.0%)	71 (40.8%)	
	Mydriasis	308 (10.3%)	80 (9.6%)	228 (10.3%)	62 (6.9%)	3 (1.7%)	
Charcoal	Charcoal	1986 (63.3%)	555 (66.1%)	1431 (63.3%)	406 (43.9%)	62 (36.5%)	<0.001
	Other Treatment	1114 (36.7%)	285 (33.9%)	829 (36.7%)	518 (56.1%)	108 (63.5%)	
Lavage	Lavage	1245 (39.8%)	345 (41.1%)	900 (39.8%)	218 (23.6%)	28 (16.5%)	<0.001
	Other Treatment	1855 (60.2%)	495 (58.9%)	1360 (60.2%)	706 (76.4%)	142 (83.5%)	
ICU Admission	Yes	362 (8.5%)	34 (4.0%)	176 (7.7%)	115 (12.2%)	37 (20.4%)	<0.001
	No	3936 (92.4%)	824 (96.0%)	2121 (92.3%)	825 (87.8%)	166 (100.0%)	
Outcome	Recovery	3806 (99.1%)	750 (99.9%)	2067 (99.5%)	830 (98.3%)	159 (95.8%)	<0.001
	Mortality	33 (0.9%)	1 (0.1%)	11 (0.5%)	14 (1.7%)	7 (4.2%)	

Table 7 shows demographics and past history of patients based on season of poisoning. The distribution of male and female patients remained relatively stable across all seasons, with no significant seasonal variation ($p = 0.40$). Drug poisoning was the most common cause in all seasons followed by opioids, peaking in winter ($n=697$ and 332). Stimulant poisoning cases were relatively stable across seasons, with a slight increase in winter (2.4%). The proportion of alcohol poisoning was highest in spring (8.9%) and lowest in winter (4.3%). Intentional poisoning had highest proportion in autumn. There was a significant differences

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.....in different seasons in terms of type of poisoning, route of exposure, type of exposure, suicide history, criminal record history and addiction history ($P < 0.05$).
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Table 16. Demographic characteristics and past history of patients with acute poisoning based on season of poisoning

	Variable	Total	Spring	Summer	Autumn	Winter	P-value
Gender	Female	2048 (47.8%)	263 (48.9%)	548 (49.4%)	496 (47.8%)	741 (46.3%)	0.40
	Male	2239 (52.2%)	275 (51.1%)	561 (50.6%)	542 (52.2%)	861 (53.7%)	
Age	<20	857 (20.1%)	101 (18.9%)	228 (20.6%)	190 (18.4%)	338 (21.1%)	0.22
	20-40	2294 (53.7%)	301 (56.5%)	607 (54.9%)	566 (54.8%)	820 (51.2%)	
	41-65	939 (22.0%)	107 (20.1%)	221 (20.0%)	231 (22.4%)	380 (23.8%)	
	>=65	181 (4.2%)	24 (4.5%)	49 (4.4%)	46 (4.5%)	62 (3.9%)	
Marital Status	Single	2167 (51.2%)	265 (49.5%)	584 (52.7%)	502 (48.7%)	816 (52.3%)	0.058
	Married	1968 (46.5%)	259 (48.4%)	510 (46.0%)	502 (48.7%)	697 (44.7%)	
	Divorced	82 (1.9%)	7 (1.3%)	12 (1.1%)	22 (2.1%)	41 (2.6%)	
	Widow	18 (0.4%)	4 (0.7%)	3 (0.3%)	5 (0.5%)	6 (0.4%)	
Level of education	Illiterate	170 (4.5%)	24 (5.3%)	42 (4.2%)	44 (4.9%)	60 (4.1%)	0.20
	Under Diploma	1654 (43.5%)	184 (40.3%)	419 (42.0%)	380 (42.5%)	671 (46.1%)	
	Diploma	1461 (38.4%)	185 (40.5%)	401 (40.2%)	330 (36.9%)	545 (37.4%)	
	College Education	519 (13.6%)	64 (14.0%)	135 (13.5%)	140 (15.7%)	180 (12.4%)	
Type of Poisoning	Medications	2020 (47.1%)	267 (49.6%)	552 (49.8%)	504 (48.6%)	697 (43.5%)	<0.001
	Opioids	789 (18.4%)	84 (15.6%)	194 (17.5%)	179 (17.2%)	332 (20.7%)	
	Stimulants	91 (2.1%)	9 (1.7%)	21 (1.9%)	23 (2.2%)	38 (2.4%)	
	Alcohol	223 (5.2%)	48 (8.9%)	54 (4.9%)	52 (5.0%)	69 (4.3%)	
	Pesticides	210 (4.9%)	28 (5.2%)	43 (3.9%)	47 (4.5%)	92 (5.7%)	
	Multiple Substance Toxicity	573 (13.4%)	62 (11.5%)	127 (11.5%)	152 (14.6%)	232 (14.5%)	
	Others	234 (5.5%)	24 (4.5%)	56 (5.0%)	52 (5.0%)	102 (6.4%)	
Route of Exposure	Oral	3801 (89.5%)	482 (90.6%)	969 (88.3%)	928 (90.2%)	1422 (89.7%)	<0.001

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	Inhalation	84 (2.0%)	11 (2.1%)	17 (1.5%)	22 (2.1%)	34 (2.1%)	
	Injection	20 (0.5%)	1 (0.2%)	7 (0.6%)	3 (0.3%)	9 (0.6%)	
	Dermal	89 (2.1%)	14 (2.6%)	49 (4.5%)	14 (1.4%)	12 (0.8%)	
	Multiple Exposure	98 (2.3%)	15 (2.8%)	19 (1.7%)	30 (2.9%)	34 (2.1%)	
	Unknown	153 (3.6%)	9 (1.7%)	37 (3.4%)	32 (3.1%)	75 (4.7%)	
Past medical history	Yes	945 (22.0%)	141 (26.2%)	224 (20.2%)	224 (21.6%)	356 (22.2%)	0.051
	No	3342 (78.0%)	397 (73.8%)	885 (79.8%)	814 (78.4%)	1246 (77.8%)	
Type of exposure	Intentional	3318 (78.3%)	430 (80.8%)	875 (79.9%)	841 (81.8%)	1172 (74.2%)	<0.001
	Accidental	857 (20.2%)	101 (19.0%)	212 (19.4%)	178 (17.3%)	366 (23.2%)	
	Caused by other	60 (1.4%)	1 (0.2%)	8 (0.7%)	9 (0.9%)	42 (2.7%)	
Psychiatric Disease history	Yes	1208 (28.2%)	156 (29.0%)	299 (27.0%)	316 (30.4%)	437 (27.3%)	0.24
	No	3079 (71.8%)	382 (71.0%)	810 (73.0%)	722 (69.6%)	1165 (72.7%)	
Suicide History	Yes	974 (22.7%)	106 (19.7%)	228 (20.6%)	236 (22.7%)	404 (25.2%)	0.010
	No	3313 (77.3%)	432 (80.3%)	881 (79.4%)	802 (77.3%)	1198 (74.8%)	
Suicide Family History	Yes	164 (3.8%)	18 (3.3%)	39 (3.5%)	48 (4.6%)	59 (3.7%)	0.47
	No	4123 (96.2%)	520 (96.7%)	1070 (96.5%)	990 (95.4%)	1543 (96.3%)	
Self-Harm History	Yes	339 (7.9%)	40 (7.4%)	83 (7.5%)	90 (8.7%)	126 (7.9%)	0.74
	No	3948 (92.1%)	498 (92.6%)	1026 (92.5%)	948 (91.3%)	1476 (92.1%)	
Criminal Record History	Yes	187 (4.4%)	18 (3.3%)	35 (3.2%)	56 (5.4%)	78 (4.9%)	0.031
	No	4100 (95.6%)	520 (96.7%)	1074 (96.8%)	982 (94.6%)	1524 (95.1%)	
Addiction History	Yes	1815 (42.3%)	215 (40.0%)	446 (40.2%)	428 (41.2%)	726 (45.3%)	0.022
	No	2472 (57.7%)	323 (60.0%)	663 (59.8%)	610 (58.8%)	876 (54.7%)	

Discussion

The purpose of the present study was to investigate the epidemiological patterns, clinical characteristics, and outcomes of patients with acute poisoning in a referral poisoning center in Iran. Our findings reveal that drug poisoning was the most common type of intoxication, followed by opioid, multiple substance, and pesticide poisonings. Pharmaceutical medications were also among the most common poisoning in study conducted in the same hospital (14, 15). Medications were identified as the leading cause of poisoning across most

regions of Iran. In studies conducted in Shiraz, Kermanshah and Tehran, pharmaceutical compounds were the most common causes of poisoning(16, 17). The high proportion of drug intoxication highlights the need for increased awareness of safe medication use and storage, and stricter regulations on over-the-counter and prescription medications to prevent overdose incidents.

Iran has long been recognized as having one of the highest rates of opium and opioid consumption, partly due to its historical and geographical proximity to Afghanistan, the world's largest producer of illicit opium(18). This geopolitical factor has led to a long-standing culture of opioid use, with opium and its derivatives being commonly abused, particularly among men(18). The availability of illicit opioids, combined with the misuse of prescription opioids, has contributed to the increasing rates of opioid-related poisoning.

The overall mortality rate in this study was low (0.8%), with the highest mortality observed in pesticide poisoning cases, followed by opioids. This aligns with previous research indicating that pesticide ingestion is a major contributor to poisoning-related deaths, particularly in developing countries where access to toxic pesticides remains widespread(12, 19, 20). The point is that although pesticide poisoning itself is responsible for only 4.9% of our hospital admissions, it is the most common cause of death in poisoned patients.

Opioid poisoning was also accounted for higher mortality rate second only to pesticide poisoning. This aligns with global trends, where opioid-related overdoses have become a leading cause of poisoning fatalities(21, 22). The patterns of opioid-related poisoning and associated mortality vary between western countries and the middle East, particularly Iran, due to differences in opioid availability, prescription practices, and patterns of substance use. In western countries, such as the United States and Canada, the opioid crisis has been largely driven by the widespread availability of synthetic opioids, particularly fentanyl and its analogs(22, 23). In contrast, in Iran, methadone poisoning has emerged as a significant public health concern. This trend could stems from the widespread availability of methadone in addiction treatment programs, as well as its diversion into the illicit market(24). Methadone poisoning is particularly dangerous due to its prolonged half-life, which leads to delayed and prolonged respiratory depression, increasing the risk of fatal outcomes if medical intervention is not promptly administered (25). Accidental ingestion, especially among children and non-opioid users, has also been reported as a concern in Iran due to improper storage of methadone at home(26).

Our study also revealed seasonal variations, age-related differences, and gender disparities in patients with acute poisonind. Women constituted the majority of patients with drug poisoning, while men accounted for the majority in other categories. The study also revealed that although deliberate self-harm was common in young adult females, mortality was higher in males which aligns with previous studies(14, 27). women are more likely to engage in non-fatal self-harm behaviors as a response to emotional distress, interpersonal conflicts, and psychiatric disorders such as depression and anxiety. Women are also more likely to seek medical attention following self-harm incidents, leading to higher rates of hospital admission but lower overall mortality. In contrast, men exhibit higher rates of completed suicide, which may be attributed to greater impulsivity, social stigma around seeking psychological support, and the use of more lethal methods(14, 28, 29).

Similar to studies conducted in Turkey (30) and India(31) the seasonal distribution in poisoning patients suggested a peak in summer and winter. One of the most notable findings



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.....was that intentional poisoning was more common in autumn, whereas accidental poisoning peaked in winter. The higher frequency of self-poisoning in autumn may be related to seasonal affective patterns, particularly the transition from warmer to colder months, which has been associated with increased psychological distress, depression, and suicide attempts. Research suggests that seasonal mood disorders and increased stress levels during autumn can contribute to higher rates of self-harm, including deliberate drug overdose(32, 33). Additionally, the end of summer and the beginning of academic or work-related pressures may exacerbate anxiety and mental health conditions, increasing the likelihood of self-poisoning in vulnerable individuals(34). Conversely, the higher prevalence of accidental poisoning in winter may be attributed to increased exposure to household toxins, medications, and heating-related toxic substances during colder months. Reduced outdoor activity and prolonged indoor stays can lead to higher risks of unintentional poisoning due to carbon monoxide inhalation, medication errors, and chemical exposures

Limitation

Our data is naturally subject to selection bias, and information bias because of nature of cross-sectional study. Additionally, as this is a hospital-based study, we recognize that the findings may not fully reflect those of the general population. Moreover some toxic agents were unspecified in the records, complicating their classification.

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پیوست:

شماره ۹:

لیست پروپوزال های نگارش شده و در حال اجرا (طرحهای تحقیقاتی/پایان نامه)

(۱) بررسی و مقایسه فراوانی و عاقبت درمانی مراجعین دچار مسمومیت با متادون، بوپرنورفین و تنتور تریاک در بیمارستان خورشید اصفهان در یک دوره دوساله (دی ماه ۱۴۰۲ لغایت آذر ماه ۱۴۰۴) کد اخلاق: IR.ARI.MUI.REC.1405.050/ تنظیم قرارداد/ طرح تحقیقاتی

(۲) بررسی مقایسه ای ترند مسمومیت ها به تفکیک جنسیت، گروه های سنی و فصل سال و ارتباط آن با پیاوند "اقتباس شده از طرح ایجاد و توسعه نظام ثبت بیماران مسموم با انواع مسمومیت های حاد در مرکز آموزشی درمانی خورشید" کد اخلاق: IR.ARI.MUI.REC.1403.185/ در حال اجرا/ طرح تحقیقاتی

(۳) بررسی الگوی مسمومیت در زنان سنین باروری (۴۵-۱۵ سال) بستری شده در اورژانس مسمومین بیمارستان خورشید در شش ماهه اول ۱۴۰۴ فاقد کد اخلاق /بررسی شورای پژوهشی دانشکده/پایان نامه

(۴) بررسی یافته های کلینیکال، توکسیکولوژیک، اپیدمیولوژیک و پیاوند در میانسالان مراجعه کننده با مسمومیت حاد در دوره ی یکساله از خرداد ۱۴۰۲ تا خرداد ۱۴۰۳ کد اخلاق: IR.MUI.MED.REC.1404.350/ در حال اجرا/پایان نامه

(۵) بررسی اپیدمیولوژیک، توکسیکولوژیک و پیاوند در بیماران مسموم با انواع الکل برگرفته از سامانه ثبت داده ها در بیمارستان خورشید از سال ۱۴۰۳ تا ۱۴۰۵ کد اخلاق: IR.MUI.MED.REC.1404.318/ در حال اجرا/پایان نامه

(۶) بررسی مقایسه ای نوع مسمومیت، فاکتورهای توکسیکوکلینیکی و پیامد در بیماران مصرف کننده سیگار به تفکیک سن و جنس در مرکز آموزشی درمانی خورشید کد اخلاق: IR.MUI.MED.REC.1404.354/ در حال اجرا/پایان نامه



شماره:

۷) مقایسه تظاهرات کلینیکی، اپیدمیولوژیک و پیامد در بیماران مسموم با SSRF و TCA
معاونت پژوهشی و فناوری کد اخلاق: IR.MUI.MED.REC.1404.030 / در حال اجرا/پایان نامه

۸) بررسی وابستگی به الکل و محرک ها و سایر ترکیبات به عنوان ریسک فاکتور مسمومیت با متادون در بیمارستان خورشید اصفهان
کد اخلاق: IR.MUI.MED.REC.1403.520 / در حال اجرا/پایان نامه

۹) بررسی مقایسه ای نوع مسمومیت (دارو/سم)، فاکتورهای توکسیکوکلینیکی و پیانند در بیماران معتاد با مسمومیت حاد به تفکیک گروههای سنی و جنس کد اخلاق:
IR.MUI.MED.REC.1402.442 / در حال اجرا/پایان نامه

۱۰) بررسی فاکتورهای توکسیکولوژیک، کلینیکال و دموگرافیک بیماران مسمومیت با داروهای ضدافسردگی سه حلقه ای در مقطع ۵ ساله (۱۴۰۳-۱۳۹۹) در بخش مسمومین بیمارستان خورشید و ارتباط آن با پیانند بیماران کد اخلاق:
IR.MUI.MED.REC.1402.315 / در حال اجرا/پایان نامه

۱۱) بررسی عوامل پیش بینی کننده مرگ و میر ناشی از مسمومیت حاد در بازه زمانی دو ساله در بیماران بستری شده در بیمارستان خورشید طرح تحقیقاتی/کد اخلاق:
IR.ARI.MUI.REC.1404.215/در حال اجرا

۱۲) بررسی تفاوت های جنسیتی در ویژگی های دموگرافیک، فاکتورهای توکسیکولوژیک و پیامدهای بالینی در بیماران مبتلا به خودکشی مکرر بستری شده در بخش مسمومین بیمارستان خورشید طی بازه زمانی یک ساله طرح تحقیقاتی/کد اخلاق:
IR.ARI.MUI.REC.1404.145/در حال اجرا

۱۳) الگوی مسمومیت ها به تفکیک نوع مسمومیت (عمدی و غیر عمدی) و سوابق بیمار مابین ۱۴۰۲-۱۴۰۳ در اطفال کمتر از ۲۰ سال طرح تحقیقاتی/کد اخلاق:
IR.ARI.MUI.REC.1404.046/در حال اجرا

۱۴) بررسی یافته های کلینیکال، توکسیکولوژیک، اپیدمیولوژیک و پیانند در سالمندان مراجعه کننده با مسمومیت حاد در دوره یکساله از خرداد ۱۴۰۲ تا خرداد ۱۴۰۳ اقتباس شده از طرح "ایجاد و توسعه نظام ثبت بیماران مسموم با انواع مسمومیت های حاد در مرکز آموزشی درمانی خورشید" طرح تحقیقاتی/کد اخلاق:
IR.ARI.MUI.REC.1403.080/در حال اجرا



شماره:

۱۵) مقایسه شدت مسمومیت در مواجهه‌های عمدی و غیرعمدی بر اساس شاخص تاریخ:
Poisoning Severity Score: یک مطالعه کوهورت گذشته‌نگر مبتنی بر پیوست:

رجیستری بخش مسمومیت‌های بیمارستان خورشید اصفهان پایان نامه/بررسی گروه/فاقد کد اخلاق/پایان نامه

۱۶) بررسی ویژگی‌های اپیدمیولوژیک و بالینی بیماران دچار مسمومیت با قرص آهن بستری شده در اورژانس مسمومین بیمارستان خورشید اصفهان از سال ۱۳۹۹ تا ۱۴۰۴ بررسی گروه/فاقد کد اخلاق پایان نامه

۱۷) الگوی مسمومیت‌ها به تفکیک سن، جنس و سوابق بیمار در سال‌های ۱۴۰۲-۱۴۰۳ در اطفال کمتر از ۲۰ سال بستری‌شده در بخش مسمومین بیمارستان خورشید (برگرفته از طرح ایجاد و توسعه نظام ثبت بیماران مسموم) در حال اجرا/ کد اخلاق: IR.MUI.MED.REC.1404.257 / پایان نامه

۱۸) بررسی تظاهرات دموگرافیک، توکسیکولوژیک، کلینیکال، پاراکلینیکال و پیانید در بیماران مسمومیت حاد با استامینوفن در بیمارستان خورشید اصفهان از سال ۱۴۰۱ تا ۱۴۰۴ در حال اجرا/ کد اخلاق: IR.MUI.MED.REC.1404.317 / پایان نامه

۱۹) بررسی مقایسه‌ای نوع مسمومیت، فاکتورهای توکسیکوکلینیکی و پیانید در بیماران مراجعه کننده به بیمارستان خورشید با مسمومیت حاد در بازه زمانی ۱۴۰۲ تا ۱۴۰۳ به تفکیک سابقه اعتیاد به چند ماده و یک ماده در حال اجرا/ کد اخلاق: IR.MUI.MED.REC.1403.497 / پایان نامه

۲۰) بررسی مقایسه‌ای نوع مسمومیت، فاکتورهای توکسیکوکلینیکی و پیانید در بیماران مصرف کننده به الکل و محرک‌ها به تفکیک گروه‌های سنی و جنسیت در حال اجرا/ کد اخلاق: IR.MUI.MED.REC.1404.137 / پایان نامه

۲۱) بررسی فراوانی عوامل محرک اقدام به خودکشی در بیماران مراجعه کننده به اورژانس مسمومین بیمارستان خورشید اصفهان در سه ماهه زمستان ۱۴۰۱ در حال اجرا/ کد اخلاق: IR.MUI.MED.REC.1403.070 / پایان نامه

۲۲) الگوی اپیدمیولوژیک، کلینیکال و پیامدهای مسمومیت با آفت‌کش‌ها: مطالعه دو ساله مبتنی بر نظام ثبت داده‌ها در بیمارستان خورشید/ فاقد کد اخلاق /بررسی در سطح معاونت پژوهشی دانشکده/طرح تحقیقاتی

نتیجه گیری:

این مطالعه بینش‌های ارزشمندی در مورد ویژگی‌های اپیدمیولوژیک و بالینی مسمومیت با مواد افیونی، به ویژه با تمرکز بر مسمومیت با تریاک در ایران، ارائه می‌دهد. یافته‌های ما، مشخصات متمایز مسمومیت با تریاک را در مقایسه با سایر مواد افیونی برجسته می‌کند. شیوع مسمومیت با تریاک در بیماران مسن، افراد دارای بیماری زمینه‌ای، افراد متاهل و بیماران کم‌سواد به طور قابل توجهی بالاتر بود. این موضوع باید در برنامه‌های آموزش عمومی و پیشگیری با هدف قرار دادن جمعیت‌های پرخطر در نظر گرفته شود.

کلیدواژه‌ها:

مسمومیت، ثبت، سموم



شماره:

تاریخ:

پیوست:

۱. مقدمه، بیان مسأله و ضرورت اجرای پژوهش

امروزه اهمیت مسمومیت با داروها و سموم بر هیچ کس پوشیده نیست و میدانیم که سم به ماده ای تلقی می شود که سبب آسیب زدن به بدن می شود و این آسیب زایی می تواند از طرق خوراکی، استنشاقی یا تماس با آن باشد. (۱) قرار گرفتن در معرض سم می تواند سبب اختلال عملکرد در اندام ها، آسیب به آن ها یا حتی مرگ شود. (۲) مسمومیت حاد در چند سال اخیر تبدیل به مسئله ی جهانی شده است زیرا در چند سال گذشته پیوسته در حال افزایش بوده و یکی از علل مهم موریبیدیته و مورتالیتی در کشورهای در حال توسعه می باشد. بهترین استراتژی برای کنترل، مدیریت و پیشگیری از مسمومیت حاد شناسایی الگوهای مسمومیت و آموزش می باشد. (۳)

یکی از انواع مسمومیت ها مسمومیت با محصولات خانگی است که انواع تصادفی آن شایع تر است و والدین نقش مهمی یکی از انواع مسمومیت ها مسمومیت با محصولات خانگی است که انواع تصادفی آن شایع تر است و والدین نقش مهمی در پیشگیری از آن ایفا می کنند، گزارشی جهت تشخیص سمیت گزارش شده از محصولات خانگی در انگلستان پس از عرضه ی محصولات جدید مانند کپسول پاک کننده مایع و تولید فرمولاسیون های متمرکز تر تهیه شده است. این گزارش سرویس اطلاعات ملی سموم 5939 (National poisoning information service) پرسش و پاسخ تلفنی در رابطه با کالاهای خانگی جمع آوری کرده که تقریباً ۱۰٪ از تمام درخواست های تلفنی در این مورد بوده است. بر این اساس اکثر مسمومیتها (۳۸۹۳ نفر، ۶۵/۵٪) مربوط به کودکان ۵ ساله یا کمتر بوده است. اکثر مواجهات در منزل (۵۷۹۵ نفر و ۹۷/۶٪) و تصادفی بودند (۵۵۶۱ نفر، ۹۳/۶٪). کپسول های مایع حاوی مواد شوینده (۶۴۷ نفر) و سفیدکننده ها (۴۸۱ نفر)، قرار گرفتن به علت مصرف خوراکی (۴۶۱۶ نفر و ۷۵/۸٪) و تماس با چشم (۵۱۳ نفر و ۸/۴٪)، شایعترین بوده است. (۴)

یکی دیگر از انواع مسمومیت ها مسمومیت با داروهاست که خود میتواند به دو شیوه عمدی (خودکشی) یا غیر عمدی رخ دهد. در سه دهه ی اخیر در حالی که رشد مرگ و میر به علت تصادفات وسایل نقلیه به نصف کاهش یافته است اما نرخ مرگ و میر به علت مسمومیت دارویی از ۶۰ درصد به ۹۰ درصد افزایش یافته که این موضوع اهمیت مسمومیت دارویی را بیان میکند. (۵) در بین مسمومیت های دارویی مسمومیت با داروهای ضد افسردگی از سال ۱۹۹۹ تا سال ۲۰۱۱ به میزان چشمگیری افزایش یافته است. (۶) در تهران نیز مسمومیت با داروی بنزودیازپینها یک چهارم کل مسمومیت های دارویی را به خود اختصاص می دهد. (۷) طی تحقیقات انجام شده در شمال ایران نیز بیشتر مسمومیت های دارویی مربوط به آرام بخش ها می باشد و ارتباط معنی داری نیز بین نوع سم، سن، جنس، شغل، محل اقامت (روستا / شهر)، علت مسمومیت (عمدی / تصادفی) و فصل که مسمومیت رخ داده است، مشخص شده است. (۸، ۹) در آخرین

مطالعه اپیدمیولوژیکی انجام شده در اصفهان نیز نشان داده شد شایع ترین روش مسمومیت از نوع خوراکی

میزان مرگ و میر ناشی از مسمومیت با مخدرهای اوپیوئیدی از سال ۱۹۹۹ (۱/۴ نفر در هر ۱۰۰۰۰) تا سال ۲۰۱۱ (۵/۴ نفر از هر ۱۰۰۰۰) تقریباً ۴ برابر شده است. محصولات قاچاق، محصولات داروخانه ای مثل کاهنده ی درد ها مسئول این مرگ و میر ها هستند. (۵) در اصفهان نیز مطالعات کوتاه مدت مقطعی در خصوص مسمومیت با مخدرها نشان می دهد که در سال ۹۲، ۴۸ درصد از مسمومیت با مخدرها در خانه و به روش تزریقی صورت گرفته است. (۱۱) در حالی که توجه زیادی به مرگ های ناشی از مسمومیت با اپیوئید ها میشود، افزایش قابل توجهی نیز در مرگ های ناشی از مسمومیت با هرویین دیده شده است به طوری که میزان مرگ های ناشی از مسمومیت با هرویین از سال ۲۰۱۱ تا ۲۰۱۲ دو برابر شده است. (۱۲) مسمومیت با انواع آفتکش ها چهارمین مسمومیت شایع و یکی از خطرناکترین مسمومیتها می باشند. آفتکش ها گروهی از مواد شیمیایی می باشند که غالباً در کشاورزی، باغبانی، جنگل داری و زمین های زراعی به منظور از بین بردن انواع زیادی از آفات کشاورزی و به دنبال آن افزایش ثمردهی محصولات استفاده می شوند. (۱۳، ۱۴) حشره کشها به چهار دسته ارگانو فسفره، کاربامات، ارگانوکلره، و پیرتروئید تقسیم بندی می شوند و برای کنترل آفت ها روی محصولات کشاورزی اسپری می شوند. (۱۵) حشره کش های ارگانو فسفره بصورت وسیعی در کشاورزی و باغبانی استفاده می شوند. اولین مورد مسمومیت با آفتکش در سال ۱۹۵۸ در کرالا اتفاق افتاد که بیش از ۱۰۰ نفر به دنبال مصرف آرد گندم آلوده به اتیل پاراتوئین (به نام Folidol E 605) مردند. (۱۶) طبق آمار سازمان بهداشت جهانی تخمین زده می شود که حدود ۱۸،۲ از هر ۱۰۰۰۰۰ کارگر کشاورزی در جهان دچار مسمومیت شغلی با آفتکش می شوند (۱۷) علاوه بر این سالانه بیشتر از ۱۶۸۰۰۰ نفر در اثر مسمومیت با آفتکش فوت می کنند که اغلبشان در کشورهای در حال توسعه رخ میدهد. (۱۸) بنابراین مسمومیت شغلی با آفتکش ها چه بصورت عمدی چه تصادفی معضل سلامت عمومی در کشورهای در حال توسعه است. (۱۹) میزان مرگ و میر و عوارضی که به دنبال مسمومیت های عمدی رخ می دهد در نهایت منجر به تحمیل فشار بیش از حد به سرویسهای بیمارستانی به ویژه در منطقه آسیا میشود. (۲۰، ۲۱) در جوامع در حال توسعه مواد شیمیایی قدیمی، سمی تر و با دوام محیطی بیشتر که با قیمت ارزان در بازار عرضه می شوند، باعث به وجود آمدن مشکلات سلامتی حاد قابل توجه و آلودگی محیط زیست شده است. (۲۲-۲۴) بجز حشره کشها، بعضی از سموم علفکش که در کشاورزی استفاده می شود مانند پاراکوات درمان قطعی برای مسمومیت آن تاکنون شناخته نشده است و بالاخره مقادیر کم بعضی از سموم چونده کش مثل فسفید آلومینیوم و فسفید

مسمومیت با فلزات نیز از موارد مهم مسمومیتهای می باشند و از آن جمله مسمومیت با سرب است، سرب یک فلز نرم و خاکستری با نمکهای سمی می باشد. مسمومیت با سرب یک بیماری جهانی تاریخی است. قرار گرفتن در معرض سرب به صورت حاد و یا مزمن ممکن است موجب آسیب قابل برگشت یا حتی دائمی در انسان شود. مواجهه با سرب در محیط زیست یک مشکل بهداشت جهانی است. مسمومیت سرب شغلی هنوز به عنوان یک مسئله بهداشتی، به ویژه در کشورهای در حال توسعه است به خصوص در دهه ی گذشته میباشد. (۲۵)(۲۶) یکی از علل مسمومیت با سرب استفاده از محصولات آرایشی میباشد. ایران بعد از کشور عربستان سعودی بزرگترین مصرف کننده مواد آرایشی در خاورمیانه بوده و سالانه حدود یک میلیارد دلار فراورده آرایشی مصرف می کند. وسایل آرایشی در صورتی که هرروزه مورد استفاده قرار گیرند و یا در مناطق نازک پوست صورت از قبیل لب، جایی که جذب خیلی بالاست، می تواند به عنوان یک منبع مهم مسمومیت باشند. در رژ لب ها ترکیبات سرب با هدف تثبیت کنندگی رنگ و نیز جهت تولید رنگ قرمز استفاده می شوند. آلودگی سربی رژ لب ها ممکن است از سرب منتقل شده از لحیم کاری بسته بندی یا رنگ سرب دار در آماده سازی محصولات یا گرد و غبار آلوده به سرب ناشی شود. ملکوتیان و همکاران میانگین سرب در سرمه های پودری مورد مصرف در شهر کرمان را ۲۵۴/۵ میکروگرم در هر گرم گزارش نمودند. (۲۷) گزارشات متعددی از مسمومیت با سرب نیز در شهرهای ایران نیز در سالهای اخیر منتشر شده است. (۲۸)

لذا با توجه به تفاوت ویژگی های اپیدمیولوژیک مسمومیتهای در مناطق جغرافیائی مختلف بسته به شرایط اجتماعی، اقتصادی و نیز میزان availability و سهولت دسترسی به داروها و سموم و با توجه به اهمیتی که آموزش مردم در پیشگیری از مسمومیت ها دارد، آگاهی از الگوی مسمومیتهای و شناخت فاکتورهای مرتبط با مسمومیت و شناسایی عوامل موثر در آن مانند سن، جنس، تحصیلات و... میتواند راهگشای خوبی در کاهش بروز مسمومیت ها باشد. از طرف دیگر شناسایی این مواد میتواند محدودیت های لازم برای جلوگیری از سوءاستفاده های ممکن را فراهم آورد با در نظر گرفتن موارد فوق لازم است تحقیقات و پژوهشهای جامع تری در این باره صورت گیرد تا سالانه هزینه های زیادی که به سیستم بهداشتی درمانی کشور به سبب مسمومیت ها و خودکشی های ناشی از آن متحمل میشود کاهش یابد و این امکان پذیر نیست مگر اینکه اطلاعات تمامی بیماران در سیستم مدونی ثبت گردد. لذا هدف از این مطالعه گردآوری و ثبت تمامی اطلاعات بیماران مسموم با انواع مسمومیت ها با توجه به اطلاعات موجود در پرونده های بیماران از نظر فاکتورهای دموگرافیک، علائم کلینیکی و پاراکلینیکی، نوع درمان و عاقبت درمانی بیماران



شماره:

مراجعه کننده به مرکز آموزشی درمانی خورشید برای اولین بار در استان اصفهان از اردیبهشت ۱۴۰۲ تا اردیبهشت ۱۴۰۵ (برای سه سال) کلیه اطلاعات بیماران بر اساس فرم جدید دیتا ریجستری ثبت خواهد شد. و از نظر فواید هزینه کردن / موثر بودن (cost/benefit) مورد بررسی قرار خواهند گرفت..

۳. اهداف پژوهش

هدف کلی: ایجاد و توسعه نظام ثبت بیماران مسموم با انواع مسمومیت های حاد در مرکز آموزشی درمانی خورشید

اهداف جزئی:

۱. تعیین و مقایسه شیوع مسمومیتها به تفکیک نوع ماده مصرفی (سموم/داروها) از اردیبهشت ۱۴۰۲ تا اردیبهشت ۱۴۰۵
۲. تعیین و مقایسه روند توزیع فراوانی فاکتورهای اپیدمیولوژیک (رده های سنی ، جنس، شغل، تحصیلات و) در انواع مسمومیتها (شامل: مسمومیتهای دارویی، مسمومیت با ترکیبات خانگی، سموم کشاورزی و) در طی سالهای مورد بررسی از اردیبهشت ۱۴۰۲ تا اردیبهشت ۱۴۰۵
۳. تعیین و مقایسه فراوانی نسبی نوع مسمومیت (خودکشی، سوء مصرف، اتفاقی، ناآگاهانه) به تفکیک انواع مسمومیتها از اردیبهشت ۱۴۰۲ تا اردیبهشت ۱۴۰۵
۴. تعیین و مقایسه فراوانی نسبی راه مسمومیت (خوردن، استنشاقی، تزریقی، پوستی، توام) در بیماران مسموم به تفکیک انواع مسمومیتها از اردیبهشت ۱۴۰۲ تا اردیبهشت ۱۴۰۵
۵. تعیین و مقایسه توزیع فراوانی علائم عصبی، قلبی عروقی، تنفسی، پوستی، کبدی، کلیوی، در بیماران مورد مطالعه به تفکیک انواع مسمومیتها از اردیبهشت ۱۴۰۲ تا اردیبهشت ۱۴۰۵
۶. تعیین و مقایسه توزیع فراوانی CO-ingestion (مصرف داروهای همزمان) به تفکیک انواع مسمومیتها و به تفکیک سن جنس ، محل زندگی بیماران از اردیبهشت ۱۴۰۲ تا اردیبهشت ۱۴۰۵
۷. تعیین و مقایسه فراوانی نسبی انواع مسمومیت به تفکیک فصل مسمومیت، سابقه اعتیاد، سابقه بیماری زمینه ای، سابقه بیماری روحی روانی، سابقه خودکشی در بیماران مورد مطالعه از اردیبهشت ۱۴۰۲ تا اردیبهشت ۱۴۰۵
۸. تعیین و مقایسه فراوانی نسبی سوء مصرف مواد در خانواده بیماران مورد مطالعه به تفکیک نوع مسمومیت از اردیبهشت ۱۴۰۲ تا اردیبهشت ۱۴۰۵



معاونت پژوهشی و فناوری

شماره:

۹. تعیین و مقایسه فراوانی نسبی سابقه اقدام به خودکشی در خانواده بیماران مورد مطالعه به

پیوست:

تفکیک نوع مسمومیت از اردیبهشت ۱۴۰۲ تا اردیبهشت ۱۴۰۵

۱۰. تعیین و مقایسه توزیع فراوانی عاقبت درمانی در بیماران مسموم به تفکیک انواع مسمومیتها

از

۱۱. تعیین و مقایسه میانگین طول مدت بستری در بیماران مسموم به تفکیک انواع مسمومیتها

از اردیبهشت ۱۴۰۲ تا اردیبهشت ۱۴۰۵

۱۲. تعیین و مقایسه فاکتورهای پیش گوئی کننده عاقبت درمانی در بیماران مورد مطالعه از

اردیبهشت ۱۴۰۲ تا اردیبهشت ۱۴۰۵

۱۳. بررسی ارتباط بین اهداف ۱۴ با اهداف ۱ الی ۱۳

۱۴. تعیین بقاء یکساله بیماران مورد بررسی

۴. روش اجرای پژوهش

این مطالعه رجیستری جهت ثبت مسمومیتها در بیمارستان تخصصی مسمومین خورشید اصفهان که مرکز ریفرال مسمومیتها در استان اصفهان می باشد انجام خواهد شد.

زمان : مطالعه از اردیبهشت ۱۴۰۲ شروع میشود و بمدت سه سال تا اردیبهشت ۱۴۰۵ بر اساس فرم جدید بازنگری شده، اطلاعات مربوط به بیماران مسموم ثبت خواهد شد.

روش اجرا و جمع آوری داده ها و نوع داده ها برای ثبت اطلاعات بیماران مسموم بر اساس مطالعات قبلی انجام شده در سایر کشورها می باشد. (۳۹-۵۵) که به شرح ذیل توضیح داده میشود.

شیوه تشخیص مسمومیت ها : تشخیص مسمومیت با توجه به شرح حال، علایم بالینی، معاینه فیزیکی و اندازه گیری سطح خونی مواد و دارو ها و یا آزمایش ادرار از نظر سم شناسی تأیید شده باشد. (پرونده بیمارانی که در بایگانی کد ICD-10 مسمومیت گرفته باشند)

معیار ورود:

- کلیه بیماران در هر گروه سنی (اطفال/بالغ/سالمند) و هر جنسیت (مرد/زن)

- بیماران با شرح حال مسمومیت که پرونده بستری در اورژانس/بخش/ICU مسمومین بیمارستان خورشید داشته باشند

- بیمارانی که پس از رفع مسمومیت بدلیل عوارض ناشی از مسمومیت به سایر بخشها منتقل شده باشند



معاونت پژوهشی و فناوری
په معيار خروج از مطالعه:

شماره:
تاریخ:
پیوست:

جهت بررسی پیاپی بیماران پرونده آنها از واحد بایگانی گرفته و بررسی خواهد شد.

بیمارانی که پس از تریاز در اورژانس مسمومین بدلیل تشخیص غیر مسمومیت (بیماریهای داخلی و یا نورولوژی و ..) به بخشهای مربوطه منتقل شده باشند.

حجم نمونه: با توجه به اینکه هر سال حدود ۷۰۰۰ تا ۸۰۰۰ بیمار حدوداً بستری می شود. برآورد می شود که حجم نمونه برای سالهای مورد مطالعه برآورد اطلاعات مربوط به ۲۱۰۰۰ هزار تا ۲۴۰۰۰ بیمار باشد که پرونده های آنها باید مورد بررسی قرار گیرد.

شیوه پیگیری بیمار برای ثبت اطلاعات :

تا زمانی که بیمار در بیمارستان بستری باشد از خود بیمار و همراهان اطلاعات لازم بدست خواهد آمد و بعد از ترخیص با توجیه بیمار و خانواده شماره تلفن و آدرس منزل دریافت شده و پیگیری های تلفنی و حضوری در درمانگاه مسمومین انجام خواهد شد.

فرایند جمع اوری اطلاعات

- ۱- بستری شدن
- ۲- شرح حال ، معاینه ، آزمایشات
- ۳- تثبیت وضعیت بیماری
- ۴- اطلاع به کارشناس ثبت
- ۵- ورود داده ها به سامانه
- ۶- تایید کارشناس ناظر
- ۷- کنترل کیفی داده ها
- ۸- آماده سازی برای تحلیل

شیوه کنترل کیفی ثبت :

- کنترل کیفی داده ها :

برای کنترل کیفی داده ها از روش double check ده در صد داده های وارد شده استفاده میشود ، همچنین با استفاده نمودارهای باکس پلات داده های پرت بررسی و در صورت نیاز تصمیم گیری خواهد شد.



کنترل کیفی فرایند :

شماره :

تاریخ :

پیوست :

این مطالعه رجیستری جهت ثبت مسمومیتها در بیمارستان تخصصی مسمومین خورشید اصفهان که مرکز ریفرال مسمومیتها در استان اصفهان می باشد انجام خواهد شد.

زمان : مطالعه از اردیبهشت ۱۴۰۲ شروع میشود و بمدت سه سال تا اردیبهشت ۱۴۰۵ بر اساس فرم جدید بازنگری شده، اطلاعات مربوط به بیماران مسموم ثبت خواهد شد.

روش اجرا و جمع آوری داده ها و نوع داده ها برای ثبت اطلاعات بیماران مسموم بر اساس مطالعات قبلی انجام شده در سایر کشورها می باشد. (۳۹-۵۵) که به شرح ذیل توضیح داده میشود.

شیوه تشخیص مسمومیت ها : تشخیص مسمومیت با توجه به شرح حال، علایم بالینی، معاینه فیزیکی و اندازه گیری سطح خونی مواد و دارو ها و یا آزمایش ادرار از نظر سم شناسی تأیید شده باشد. (پرونده بیمارانی که در بایگانی کد ICD-10 مسمومیت گرفته باشند)

معیار ورود:

- کلیه بیماران در هر گروه سنی (اطفال/بالغ/سالمند) و هر جنسیت (مرد/زن)

- بیماران با شرح حال مسمومیت که پرونده بستری در اورژانس/بخش/ICU مسمومین بیمارستان خورشید داشته باشند

- بیمارانی که پس از رفع مسمومیت بدلیل عوارض ناشی از مسمومیت به سایر بخشها منتقل شده باشند جهت بررسی پایانید بیماران پرونده آنها از واحد بایگانی گرفته و بررسی خواهد شد.

معیار خروج از مطالعه:

بیمارانی که پس از تریاژ در اورژانس مسمومین بدلیل تشخیص غیر مسمومیت (بیماریهای داخلی و یا نورولوژی و ..) به بخشهای مربوطه منتقل شده باشند.

حجم نمونه: با توجه به اینکه هر سال حدود ۷۰۰۰ تا ۸۰۰۰ بیمار حدودا بستری می شود. برآورد می شود که حجم نمونه برای سالهای مورد مطالعه برآورد اطلاعات مربوط به ۲۱۰۰۰ هزار تا ۲۴۰۰۰ بیمار باشد که پرونده های آنها باید مورد بررسی قرار گیرد.

شیوه پیگیری بیمار برای ثبت اطلاعات :

تا زمانی که بیمار در بیمارستان بستری باشد از خود بیمار و همراهان اطلاعات لازم بدست خواهد آمد و



شماره:

تاریخ:

پیوست:

بعد از ترخیص با توجیه بیمار و خانواده شماره تلفن و آدرس منزل دریافت شده و پیگیری های تلفنی و

معاونت پژوهشی و فناوری در درمانگاه مسمومین انجام خواهد شد.

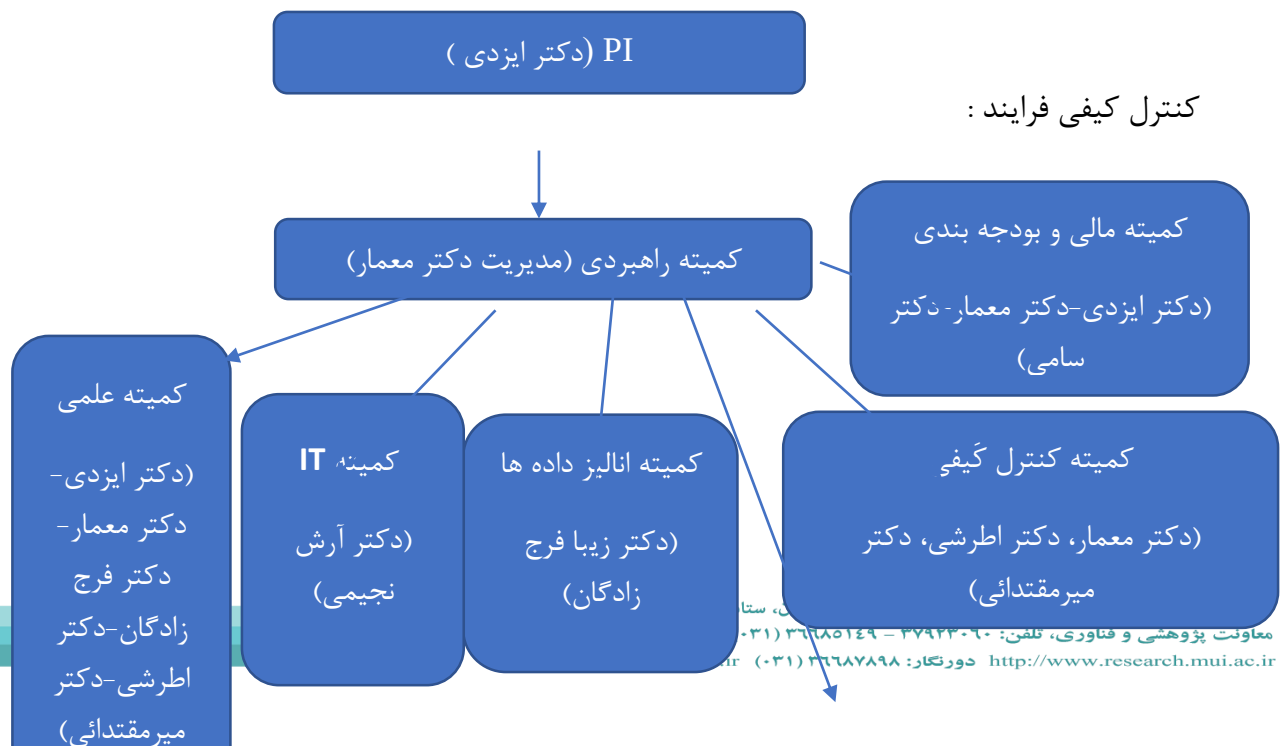
فرایند جمع اوری اطلاعات

- ۹- بستری شدن
- ۱۰- شرح حال ، معاینه ، آزمایشات
- ۱۱- تثبیت وضعیت بیماری
- ۱۲- اطلاع به کارشناس ثبت
- ۱۳- ورود داده ها به سامانه
- ۱۴- تایید کارشناس ناظر
- ۱۵- کنترل کیفی داده ها
- ۱۶- آماده سازی برای تحلیل

شیوه کنترل کیفی ثبت :

- کنترل کیفی داده ها :

برای کنترل کیفی داده ها از روش double check ده در صد داده های وارد شده استفاده میشود ، همچنین با استفاده نمودارهای باکس پلات داده های پرت بررسی و در صورت نیاز تصمیم گیری خواهد شد.





معاونت پژوهشی و فناوری

شماره:
تاریخ:
پیوست:

کارشناس ثبت

دانشجویان پزشکی (اینترن) و فارغ التحصیل های
پزشکی عمومی و کارشناسان لیسانس و فوق
لیسانس بخصوص گروه های وابسته به پزشکی
(پیراپزشکی) مسوول جمع آوری و ثبت اطلاعات
هستند.

برنامه ثبت کامپیوتری به گونه ای طراحی میشود که بدون انجام فرایندهای هر مرحله امکان ورود به
مراحل بعدی وجود نداشته باشد و در صورت عدم صحت داده ها و یا نامناسب بودن آن الارم دهد .

کنترل کیفی سیستم رایانه ای :

کیفیت نرم افزار، مطابق با نیازهای عملیاتی و استانداردهای توسعه نرم افزار تعریف و تدوین می گردد و در
این میان، توجه به سه اصل ذیل اهمیت دارد:

- -استانداردها ؛
- -توجه به نیازهای جانبی؛
- -انطباق با آنچه نرم افزار برای آن طراحی گردیده است

شیوه گزارش گیری :

در نرم افزار ثبت داده ها این قابلیت وجود دارد که داده های خام به نرم افزار های اماری اکسپورت میشوند
و با استفاده از امار توصیفی ، فراوانی ، درصد ، میانگین و انحراف معیار قابل استخراج میباشد و همچنین
با استفاده از جداول داده ها خلاصه سازی شده سپس تحلیل میشود

مشخصات ابزار جمع آوری داده ها و نحوه جمع آوری :

انوار جمع آوری اطلاعات بصورت چک لیست فرم جمع آوری داده ها حاوی اطلاعات زیر میباشد نوع سم

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آنتی سایکوتیکها، سداتیو هیپنوتیکها (بنزودیازپینها، باربیتوراتها، ..) ضد تشنجه (کاربامازپین، گاباپنتین، لاموتریزین، ..)، داروهای کاهنده قند خون (مت فورمین، انسولین، گلیبنکلامید و ..) داروهای مسکن (استامینوفن، آسپرین، NSAIDs، ..)، مخدرها (تریاک، هروئین، ترامادول، بوپرونورفین، دیفنوکسیلات، متادون، ..)، محرکها و روان گردانها (شیشه، آمفتامینها، متامفتامینها، کراک، LSD، حشیش، ..)، الکها (اتانول، متانول، اتیلن گلیکول، ..) داروهای قلبی-عروقی (بتابلوکرها، کلسیم بلوکرها، ...)، داروهای OTC (مولتی ویتامینها، ضد استفراغ، ...)، و سایر داروها، گازهای سمی، مسمومیتهای گیاهی، گزیدگی ها، جنس بیمار (زن/مرد)، روش مسمومیت (خوراکی، پوستی، استنشاقی، وریدی)، شغل (خانه دار، آزاد، کارمند، محصل، ...)، نحوه مسمومیت (عمدی، غیر عمدی، سوء مصرف، ناآگاهانه) سن بیمار، جنسیت، سابقه بیماری زمینه ای (قلبی، کلیوی، ریوی، دیابت، ...) سابقه اعتیاد (مخدر، محرک، الکل و سیگار...) سابقه بیماری روانی در فرد و خانواده، سابقه خودکشی در فرد و خانواده، محل سکونت اصفهان محل مسمومیت (منزل، مدرسه، خیابان، پارک، باغ، محیط کار و ..)، فاصله زمانی خوردن تا مراجعه، محل بستری (بخش، واحد مراقبتهای ویژه)، نام پدر، Medical record number، شهر محل سکونت در استان اصفهان (اصفهان، سمیرم، خمینی شهر و ...) و یا خارج از استان اصفهان (کاشان، قم، چهارمحال بختیاری و ...)، محل و کشور تولد یافته، آدرس محل زندگی و محل کار، نوع بیمه، شماره همراه، وضعیت شغلی، نام پزشک معالج، محل اولین معالجه، زمان اولین معالجه، محل ارجاع، تشخیص اولیه، فرم دارو، مشاوره ها (داخلی، نورولوژی، نفرولوژی، گوارش، جراحی، ریه، ..)، آنتی دوت های مورد استفاده، اقدامات درمانی (شستشوی معده، زغال فعال، شستشوی کل دستگاه گوارش، مسهل)، روشهای افزایش دفع سم (دیورز قلیائی، همودیالیز، هموفیوژن، ..)، پلاسما فرز، تعویض خون، ECMO، اکسیژن هیپر باریک و بالاخره عاقبت درمانی (بهبودی/ مرگ و میر) می باشد. مدت بستری بر اساس ساعت ثبت میگردد. همچنین زمان از بین رفتن عوارض و یا مرگ و میر بر اساس روز ثبت خواهد شد و بصورت (کمتر از یک هفته، یکماه، سه ماه، شش ماه، یکسال، بیشتر از یکسال و ..) تقسیم بندی خواهد شد. ماهیت بیماران مسموم به گونه ای است که شرح حال بیماران مسموم ممکن است unreliable باشد. لذا شرح حال هم از بیمار و هم همراهان وی گرفته می شود. اما اگرچه شرح حال از بیمار و همراهان گرفته میشود تنها نمیتوان به شرح حال اکتفا نمود. سایر اطلاعات تکمیلی از قبیل معاینه فیزیکی انجام شده توسط پزشک و نتایج پاراکلینیک از قبیل آزمایشات مختلف سم شناسی و بیوشیمی، ... جهت تأیید نوع مسمومیت انجام و نهایتاً تشخیص مسمومیت در صفحه اول و در خلاصه پرونده بیمار طبق سیستم ICD-10 نامگذاری و در HIS



شماره:

تاریخ:

پیوست:

ثبت می شود. در صورتی که نوع مسمومیت علیرغم بررسی همه موارد فوق از نظر نوع ماده مصرفی مشخص
معاونت پژوهشی و فناوری "مسمومیت با ماده نامشخص یا "Unknown toxicity" با کد مربوطه در سیستم HIS
ثبت میگردد.

علائم ناشی از درگیری ارگانهای مختلف نیز بر اساس شدت مسمومیت بر اساس poisoning severity score تقسیم بندی خواهند شد. آزمایشات مورد بررسی شامل بررسی عملکرد کلیه (اوره و کراتی نین)، کبد (ALT, AST, PT, PTT, INR)، فرمول شمارش خون محیطی، قند خون و الکتrolیتها (سدیم، پتاسیم)، گازومتری خون وریدی (pH , PCO_2 , PaO_2 , HCO_3) و سایر آزمایشات سم شناسی شامل سطح سرمی داروها (سالیسیلات، استامینوفن، سدیم والپروات، لیتیم، آهن، دیگوکسین، متانول، فنوباریتال، ...، و اسکرین توکسیکولوژی ادرار) می باشد.

پس از اخذ مجوز با ریاست محترم بیمارستان خورشید و مسئول محترم بایگانی هماهنگی نموده تا پرونده های مورد نظر در اختیار کارشناسان بررسی کننده قرار گیرد. کارشناسان جمع آوری اطلاعات از پرونده های بیماران مسموم روزانه ۵۰ پرونده در صورت تائید بیمارستان از بایگانی استخراج خواهد شد. سپس کارشناسان پرونده ها را بررسی و داده های موجود در پرونده ها در فرم جمع آوری اطلاعات ثبت می شود و بعد وارد سامانه خواهد گردید. اطلاعات مربوط به آزمایشات بیماران در صورت موجود بودن در بانک اطلاعات بیمارستان (HIS)، توسط واحد آمار بیمارستان جمع آوری میگردد. از ۱۰۰ متغیر ثبت شده در فرم جمع آوری داده ها، هشتاد متغیر از پرونده ها استخراج میشود و ۲۰ متغیر از سیستم HIS بیمارستان بدست می آید. در HIS اطلاعات عمومی شامل دموگرافیک بیماران و اطلاعات مربوط به بعضی از درمانهای انجام شده موجود است که در این طرح درمان بیماران در فرمها ثبت نمی شود. در سیستم HIS بیمارستان دسترسی به بعضی از خدمات درمانی (شامل آنتی دوت تراپی، شارکول تراپی، شستشوی معده) و آزمایشات در خواستی توسط پزشک برای بیمار (BUN, Cr, Na, K, PTT, PT, INR, VBG, Ca, P, ALT, AST.....) موجود می باشد که کارشناسان جمع آوری دیتا در مطالعه ما هیچکدام از این داده ها را ثبت نمی کنند بلکه این اطلاعات را از سیستم HIS بازپایی و در فایل رجیستری وارد می گردد.

لذا کلیه پرونده ها مطالعه و اطلاعات مربوط به شرح حال و معاینه فیزیکی انجام شده از متن پرونده استخراج میشود. پس تقریباً ۲۰٪ اطلاعات از HIS بدست می آید. اطلاعات خدمات درمانی و مراقبتی در فرم مذکور ثبت نمی شود. اطلاعات تمامی بیماران مسموم ثبت میگردد. فرم جمع آوری داده ها بگونه ای طراحی شده است که تمامی مسمومیت ها چه شغلی و چه خودکشی را پوشش می دهد. لازم بذکر است مسمومیتهای شغلی نیز همانند سایر مسمومیتهای بر روی سیستمهای مختلف بدن تاثیر میگذارند که



شماره:

تاریخ:
عصبی: مرکزی و
پوست:
معاونت پژوهشی، ...) در فرم جمع آوری اطلاعات موجود می باشد. در نهایت داده ها توسط مشاور آمار آنالیز می گردد. اطلاعات موجود وارد نرم افزار SPSS نسخه ۲۲ (IBM corporation, Armonk, version 22, NY) شده و با استفاده از آزمون های آماری مناسب (one way ANOVA, Chi square, or fisher exact test, Logistic regression,) مورد تجزیه و تحلیل قرار می گیرد. مقادیر P کمتر از ۰,۰۵ بعنوان اختلاف معنی دار در نظر گرفته می شود.

مدارک بایگانی : از تاریخ اول اردیبهشت ۱۴۰۲ اطلاعات مورد نیاز از پرونده های موجود در بایگانی استخراج میشود. به همین منظور ۱۰ نفر کارشناس در هر سال به مدت ۸ ساعت تحت آموزش مفاهیم و محتوای پرونده ها قرار میگیرند و برای اطمینان از صحت کار ده پرونده زیر نظر محققین ثبت میگردد تا اشکالات احتمالی برطرف گردد. برای پرونده های جدید ثبت توسط کارشناس گروه انجام میگیرد که با روش فوق تحت آموزش قرار میگیرند.

ساختار مدیریت ثبت

در ابتدای شروع برای ثبت، کلاس آموزشی برای کارشناسان که داده ها را وارد می کنند گذاشته می شود و در مورد تک تک جزییاتی که گروه ثبت وارد فایل می نمایند اطلاعات کامل ارایه می گردد. بشکل دوره ای هر سه ماه یک بار بصورت بازآموزی برای گروه ثبت پرونده ها، یادآوری چگونگی ورود دیتاها تکرار می گردد. محققان اصلی (دکتر ایزدی مود و دکتر معمار) در اوایل بر هر ورود ثبتی نظارت کامل قبل از ورود به نرم افزار را دارند و پس از روتین شدن برنامه، ماهیانه پرونده ها توسط یکی از محققان اصلی و یکی از همکاران ارزیابی و بررسی می شود که ورود دیتاها کاملا درست و در حد امکان بدون نقص باشد. هر ۶ ماه یک بار آنالیز مقدماتی انجام خواهد شد که در درجه اول متوجه داده های پرت شویم و در درجه دوم اشکالات آماری استخراج گردد. برنامه بر این اساس است که در سامانه آلارم هایی گذاشته شود که در صورتی که در ورود دیتاها خارج از نرمال گزارش شده باشد با الارم، ثبت کننده متوجه این اشتباه گردد.

این مطالعه در ۴ مرحله انجام می شود:



شماره:

تاریخ:

پیوست:

۱- شناسایی و طراحی فرم گزارش الکترونیک موارد مسمومین
معاونت پژوهشی و فناوری طراحی و ساخت سامانه آنلاین ثبت اطلاعات بر اساس فرم گزارش الکترونیک

۳- پایلوت سامانه ثبت گزارش مسمومین

۴- ثبت اطلاعات مسمومین مراجعه کننده به بیمارستان

جزئیات مراحل اجرایی طرح

مرحله اول: شناسایی و طراحی فرم گزارش الکترونیک موارد مسمومین

این مرحله بر اساس گام های زیر انجام می شود:

الف: شناسایی جزئیات اطلاعاتی مورد نیاز

این گام با استفاده از دو روش بررسی متون و استفاده از نظرات متخصصین انجام می شود. بررسی متون بر اساس جستجوی منابع و راهنمای مطالعات بالینی مسمومین انجام می شود. در جستجوی منابع از پایگاه های اختصاصی مسمومیت و همچنین نظام های ثبت بین المللی استفاده می شود.

استفاده از نظرات متخصصین جهت شناسایی کلیه اجزای مورد نیاز اطلاعات نیز با استفاده از نظر ۱۰ متخصص در زمینه های سم شناسی، طب اورژانس و اپیدمیولوژی انجام می شود.

کلیه اجزای اطلاعاتی جمع آوری شده بر اساس معیار های ضرورت، قابلیت استفاده بالقوه، مرتبط بودن و قابلیت جمع آوری بر اساس فرم امتیاز بندی توسط پانل متخصصین مورد بررسی قرار می گیرند.

ب: بررسی فرم های موجود ثبت اطلاعات مسمومین: کلیه اجزای فرم های موجود ثبت اطلاعات مسمومین توسط یکی از متخصصین با بررسی پرونده و فرم های خام مشخص می گردد

ج: مقایسه اجزای اطلاعاتی بدست آمده از گام یک و اطلاعات در گام ۲: کلیه کمبود های موجود با مقایسه دو مجموع اجزای اطلاعاتی مشخص می شود و این موارد مجدد در پانل متخصصین مورد بازبینی قرار می گیرند.

د: ساخت فرم الکترونیک اولیه: بر اساس مراحل فوق در پایان این مرحله نسخه اولیه فرم گزارش الکترونیک ثبت اطلاعات مسمومین تهیه می شود.

مرحله دوم: طراحی و ساخت سامانه آنلاین ثبت اطلاعات بر اساس فرم گزارش الکترونیک

این سامانه به منظور مدیریت روند ثبت و با توجه به نیاز محققین به ثبت در هر زمان و مکان



شماره:

تاریخ:

پیوست:

دریافت گزارشات و همچنین امنیت بستر اطلاعات ایجاد می شود.

معاونت پژوهشی و فناوری

این فرایند بصورت یک مرحله توسعه نرم افزار (Software development)، می باشد. در مرحله طراحی نرم افزار این مطالعه از مدل RAD (Rapid Application Development Methodology) استفاده می شود. پس از اجرا نیز ساختار نرم افزار و همچنین کارایی و رضایتمندی کاربران آن ارزشیابی می گردد.

مرحله طراحی

براساس مدل RAD روش اجرای ما در مرحله طراحی شامل مراحل زیر است:

1. Research
2. Planning
3. Design
4. Module development

Module development1	→	Testing	→	Feedback
Module development2	→	Testing	→	Feedback
Module development3	→	Testing	→	Feedback
.				
.				
.				
5. Integration
6. Setup
7. Maintenance

فاز I: Research (امکان سنجی، تعیین ضروریات و الزامات سامانه)

با توجه به نیازهای سیستم های الکترونیک و همچنین کاربران یعنی کارشناسان ورود اطلاعات، محققین، مدیران و پزشکان لازم است فهرست ضروریات سامانه در ۲ بخش پژوهشی و فنی تهیه گردد. این کار با استفاده از مرور متون موجود و نیاز سنجی اولیه انجام می شود.

فاز II: Planning (برنامه ریزی درباره اجزای سامانه)

پس از تعیین الزامات پژوهشی و فنی، محققین طرح ضمن مشاوره با متخصصین برنامه ریزی نرم افزار، چارچوب اولیه و اجزای کلی نرم افزار بر اساس فرم مرحله قبل که قابلیت مطالعه و خواندن توسط برنامه ریزان



شماره:

تاریخ:

پیوست:

معاونت پژوهش قابل فهم توسط برنامه نویسی ها است.

فاز III: Design

Layout و Interface نرم افزار و سامانه منطبق با Plan تهیه شده، توسط تیم مهندسی طراحی می شود.

فاز IV: Module development

در این مرحله ماژول های سامانه هر کدام در یک فرایند Development سپس Testing و در نهایت Feedback را اجرا می شود.

فاز V: Integration

در این مرحله از فاز از ماژول ها خارج شده و کل نرم افزار توسط تیم فنی بصورت یک خروجی قابل نصب در می آید. در این مرحله تلاش می شود که سطح یکپارچگی نرم افزار با سایر سیستم های کاربردی دانشگاه بالا رود.

فاز VI: Setup (توسعه و نصب سامانه و نرم افزار کارپوشه الکترونیک)

در این مرحله back end اپلیکشن توسط تیم فنی مشخص می گردد. وب سرور، پایگاه داده، API ها و راه حل های ذخیره سازی توسط تیم مهندسی تعیین خواهد شد.

فاز VII: Maintenance

فعالیت های مرحله نگهداری نرم افزار انجام شد، به چهار دسته بودند:

♦ نگهداری تصحیحی: دریافت گزارشات از خطاها، رفع مشکلات و تصحیح آنها در مرحله پایلوت

♦ نگهداری تطبیقی: تعیین تاثیر تغییرات محیطی روی نرم افزار و سپس دستکاری سیستم به نحوی که بر

این تغییرات فایق آید



نگهداری تکمیلی: دریافت پیشنهادات کاربران و درخواستهایی برای توسعه و یا دستکاری نرم افزار، ارزیابی

♦ نگهداری پیشگیری کننده: برنامه ریزی برای تغییر ساختار کد برنامه و پیاده سازی و تست آنها جهت اطمینان یافتن از عدم وجود تاثیرات منفی

مرحله سوم: پایلوت سامانه ثبت گزارش مسمومین

فرم الکترونیک تهیه شده در قالب سامانه با استفاده از ثبت ۱۵ مورد از پرونده های مربوط به سال ۱۴۰۲ و ۱۰ مورد پرونده های جاری توسط دو کارشناس ورود اطلاعات مورد بررسی و ارزیابی فنی، دقت، کاربرپسندی و تسهیل ورود قرار می گیرد.

مرحله چهارم: ثبت اطلاعات مسمومین مراجعه کننده به بیمارستان

پس از تأیید پروپوزال اطلاعات از اردیبهشت ۱۴۰۲ تا اردیبهشت ۱۴۰۵، توسط کارشناسان گروه و بیمارستان به مدت سه سال وارد سامانه می گردد. نوع مطالعه رجیستری می باشد و محیط پژوهش در بیمارستان خورشید اصفهان است. جامعه ی مورد مطالعه مراجعه کنندگان به بخش مسمومیت این بیمارستان در نظر گرفته شده که از اردیبهشت ۱۴۰۲ به بعد مراجعه نموده اند. و با تشخیص مسمومیت حاد بستری شده اند. جمع آوری اطلاعات به شکل سرشماری می باشد و کارشناسان مسئول تک پرونده ها در طی این مدت را بررسی مینمایند.

۵. یافته ها

شماره:

تاریخ:

پیوست:

تخمین زده می‌شود که مسمومیت با مواد مختلف سالانه بیش از یک میلیون بیماری ایجاد می‌کند (۲۱). در مطالعه‌ای توسط علی‌نژاد و همکاران، مسمومیت حاد ناشی از مواد، سومین علت مرگ و میر ناشی از خودکشی بود (۴). هر ساله تقریباً ۳۰۰۰۰ مسمومیت در تهران رخ می‌دهد که منجر به نزدیک به ۱۲۰۰۰ بستری در بخش‌های سم‌شناسی، ۱۲۰۰ بستری در بخش‌های مراقبت‌های ویژه سم‌شناسی و حداقل ۱۲۰ مرگ می‌شود (۴). میزان مسمومیت در بین کشورها متفاوت است و می‌تواند به متغیرهایی مانند سبک زندگی، سطح اقتصادی-اجتماعی، دیدگاه‌های فرهنگی و دسترسی آسان به مواد مضر مانند آفت‌کش‌ها و داروها (۲۲) که هم کشورهای توسعه‌یافته و هم در حال توسعه را تحت تأثیر قرار می‌دهد، نسبت داده شود. ایران نیز از این قاعده مستثنی نیست (۴). در سال ۲۰۲۳، بیمارستان خورشید یک سیستم ثبت داده‌های بیمار ایجاد کرد تا جزئیات بیماران مسموم، از جمله اطلاعات جمعیت‌شناختی، وضعیت اقتصادی-اجتماعی، نوع مسمومیت و روش درمان را به طور کامل تجزیه و تحلیل کند.

بیمارستان خورشید به عنوان مرکز ارجاع موارد مسمومیت حاد در بخش مرکزی ایران فعالیت می‌کند. در این مطالعه، ما روش‌های ثبت و اطمینان از صحت اطلاعات جمع‌آوری‌شده در این مرکز را شرح می‌دهیم. نگرانی اصلی ما احتمال خطا در هر سطحی، از تشخیص بیماری تا ثبت اطلاعات بیماران در سیستم بود. خطاها ممکن است در هر مرحله از گرفتن شرح حال، تشخیص بیماری یا ورود اطلاعات به سیستم رخ دهند. اقداماتی برای به حداقل رساندن احتمال خطا در تمام سطوح انجام شده است.

ماهیت بیماران مسموم اغلب منجر به شرح حال‌های نادرست می‌شود. به محض ورود به بخش اورژانس، از بیماران خواسته می‌شود که شرح حال پزشکی خود را ارائه دهند و آزمایش‌های لازم تجویز می‌شود. شرایط بیمار بر اساس شرح حال بیمار، نتایج آزمایش‌ها و مشاوره با یک متخصص آماده به کار تشخیص داده می‌شود. کارورزان، رزیدنت‌های بیمارستان و متخصصان سم‌شناسی روزانه همه بیماران را برای تأیید تشخیص‌هایشان معاینه می‌کنند.

برای کاهش احتمال خطا در ثبت اطلاعات بیمار، کارشناس ثبت اطلاعات، شرح حال بیمار را وارد کرده و اطلاعات را در همان روز در سیستم ثبت می‌کند. این سیستم به گونه‌ای طراحی شده است که از پیشرفت به مرحله بعدی بدون ورود کامل اطلاعات جلوگیری کند و در نتیجه احتمال خطا را کاهش دهد. علاوه بر این، یک کارشناس دیگر ۱۰٪ از اطلاعات ثبت شده را برای اطمینان از صحت آن، دوباره بررسی می‌کند. از این سیستم برای استخراج و تجزیه و تحلیل تمام داده‌های لازم برای این بررسی استفاده شد. مطالعه ما، داروها را به عنوان شایع‌ترین علت مسمومیت حاد (۴۷٪) و پس از آن مواد افیونی (۱۸،۴٪) و مسمومیت‌های دارویی متعدد (۱۳،۴٪) شناسایی کرد. این یافته با بررسی‌های ملی در ایران که مسمومیت دارویی را به عنوان علت اصلی مسمومیت گزارش کرده‌اند، همسو است (۴). با این حال، لازم به ذکر است که مسمومیت با تریاک و مواد افیونی نیز بخش قابل توجهی از موارد را در مرکز ما تشکیل می‌دهند که با مطالعات قبلی که شیوع مسمومیت با تریاک در ایران را برجسته می‌کنند، مطابقت دارد (۴). در حالی که برخی از کشورهای در حال توسعه، مواد شیمیایی خانگی را به عنوان علت اصلی حوادث مسمومیت گزارش می‌کنند (۲۳)، اهمیت مسمومیت‌های دارویی و مواد افیونی در مطالعه ما، چالش‌های منحصر به فردی را که در بافت ایران با آن مواجه هستیم، برجسته می‌کند و به طور بالقوه منعکس‌کننده عواملی مانند دسترسی به داروهای تجویزی، الگوهای سوء مصرف مواد مخدر و در دسترس بودن مواد افیونی است.



شماره:

تاریخ:

پیوست:

میزان مرکز و میر ۰,۸ درصدی در مطالعه ما نسبتاً پایین است که نشان دهنده اثربخشی پروتکل‌های درمانی به کار رفته در مرکز اورژانس مسمومیت بیمارستان خورشید است. از آنجایی که ما شدت مسمومیت را در موارد خود تعیین نکردیم، این علیرغم تعداد بالای افراد بستری شده به دلیل مسمومیت عمدی است که اکثریت قریب به اتفاق موارد در مطالعه ما را تشکیل می‌داد.

در واقع، ۲۲,۷ درصد از بیماران ما سابقه اقدام به خودکشی داشتند. این میزان بالای مسمومیت عمدی، نیاز فوری به بهبود خدمات سلامت روان و برنامه‌های پیشگیری از خودکشی در مرکز ایران را برجسته می‌کند. یک مطالعه مشابه در تهران نیز نشان داد که بخش قابل توجهی از موارد مسمومیت مربوط به اقدام به خودکشی است (۲۴) که بر اهمیت پرداختن به مسائل سلامت روان در زمینه تلاش‌های پیشگیری از مسمومیت تأکید می‌کند. این واقعیت که اکثر این بیماران با موفقیت درمان شدند، اهمیت وجود مراکز مسمومیت مجهز و دارای پرسنل کافی را برجسته می‌کند.

هنگام بررسی الگوهای خاص جنسیتی مسمومیت، داده‌های ما تفاوت‌های قابل توجهی را در عوامل ایجادکننده نشان داد. مسمومیت دارویی در زنان (۶۸,۶٪) در مقایسه با مردان (۳۱,۴٪) به طور قابل توجهی شایع‌تر بود. برعکس، مسمومیت با مواد افیونی در مردان (۷۶,۷٪) به طور قابل توجهی بیشتر از زنان (۲۳,۳٪) بود. با وجود این تفاوت‌ها، داروها همچنان عامل اصلی مسمومیت در هر دو جنس بودند. این تغییرات خاص جنسیتی ممکن است منعکس کننده تفاوت در مصرف دارو، الگوهای سوء مصرف مواد و مسیرهای بالقوه مواجهه بین مردان و زنان باشد. به عنوان مثال، ممکن است برای زنان داروهای خاصی برای شرایطی مانند اضطراب یا افسردگی تجویز شود که خطر مسمومیت مرتبط با دارو را، چه عمدی و چه غیرعمدی، افزایش می‌دهد. مطالعات مشابه (۲۵) نیز تفاوت‌های جنسیتی در علت‌شناسی مسمومیت را گزارش کرده‌اند، اگرچه الگوهای خاص ممکن است بسته به جمعیت و منطقه متفاوت باشند. تحقیقات بیشتری برای بررسی عوامل زمینه‌ای مؤثر در این نابرابری‌ها و تدوین استراتژی‌های پیشگیری هدفمند برای هر جنس مورد نیاز است.

۷. نتیجه‌گیری

این مطالعه بینش‌های ارزشمندی در مورد ویژگی‌های اپیدمیولوژیک و بالینی مسمومیت با مواد افیونی، به ویژه با تمرکز بر مسمومیت با تریاک در ایران، ارائه می‌دهد. یافته‌های ما، مشخصات متمایز مسمومیت با تریاک را در مقایسه با سایر مواد افیونی برجسته می‌کند. شیوع مسمومیت با تریاک در بیماران مسن، افراد دارای بیماری زمینه‌ای، افراد متاهل و بیماران کم‌سواد به طور قابل توجهی بالاتر بود. این موضوع باید در برنامه‌های آموزش عمومی و پیشگیری با هدف قرار دادن جمعیت‌های پرخطر در نظر گرفته شود.

۸. پیشنهادهای پژوهش



معاونت پژوهشی و فناوری
استان مازندران

شماره:

تاریخ:

پیوست:

بنابر این توصیه می‌کنیم تحقیقات آینده با حجم نمونه بزرگتر و تعداد بیشتری از رویدادهای پیامد، یافته‌های

ما را بیشتر تأیید کنند.

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Introduction: Acute poisoning is a frequent cause of hospitalization and death in hospital in developing countries. Due to the diverse nature of poisoning cases in various epidemiological and socioeconomic settings, it is advisable to conduct additional research to assess the patterns of poisoning and the factors associated with it in central Iran. A data registration system was implemented at Khorshid Hospital's Poisoning Emergency Center (KHPEC), the main referral center for poisoning cases in central Iran.

Methods: The data collection process includes the following steps; a) Hospitalization, b) History taking, performing a physical examination, as well as lab testing, c) stabilization of the disease state, d) Notification to the registration expert, e) Data entry into the system, g) Confirmation of supervising expert, h) Data quality control, and f) Preparation for analysis.

Results: In this study, 4,297 patients were recorded by the data registration system during May 2024 to May 2025. The mean age of the participants was 33.06 years (SD = 14.98, ranging from 1 to 102), with 47.8% being female. Drug poisoning was responsible for the most cases (N=2020, 47.0%) followed by opioids (N=789, 18.4%), multiple substances poisoning (N=574, 13.4%), alcohols (N=223, 5.2%) and pesticides (N=210, 4.9%). The most common type of exposure was intentional (77.2%). Oral ingestion was the most common route of exposure (88.5%). 8.5% of all patients admitted to ICU and 0.8% of our patients died during hospitalization.

Conclusion: The KHPEC provided an opportunity for ongoing monitoring and evidence-based decision-making in poisoning prevention and treatment.

Key words: Epidemiology, Poisoning, Registries, Data management

شماره:
تاریخ:
پیوست:



Vice-Chancellery for Research and Technology

Study Code: 199584

Title:

Establishment and development of a registration system for poisoning patients with different toxins admitted in Khorshid Educational and Medical Center

Principle Investigator:

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معاونت پژوهشی و فناوری

شماره:
تاریخ:
پیوست: