

Overview of different IT solutions for reducing no-shows and unexplained patient cancellations in health tourism

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OVERVIEW OF DIFFERENT IT SOLUTIONS FOR REDUCING NO-SHOWS AND UNEXPLAINED PATIENT CANCELLATIONS IN HEALTH TOURISM

Abstract

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Purpose - In the dynamic world of health tourism, where more and more patients are travelling across different countries in search of healthcare and wellness services, missed appointments and unexpected cancellations, known as no-shows, have become a major challenge for this type of industry. These incidents affect the expansion of infrastructure, result in loss of revenue and negatively impact the waiting list and quality of care for other patients. This paper is an overview and review of 10 years of personal experience and different papers and articles that address these pressing health tourism challenges, their causes and possible solutions that could help minimise the number of no-shows. Therefore, the following hypothesis is put forward: H1 The integration of modern information and communication technology solutions can have a positive impact on the problem of patient no-shows and unexplained cancellations. *Findings* - Research shows that missed appointments and no-shows have multiple reasons, such as: “forgetfulness”, “transportation issues” and “time off work”. They also differ by type of health tourism, medical specialty, socioeconomic status, gender, age, place of residence, etc. Research also shows that no-shows cost the healthcare industry over 150 billion dollars annually. *Design/methodology/approach* - This paper reviews the existing literature and examines various tools, methods, strategies and techniques used to predict patient no-shows. It identifies the key factors that can help reduce the incidence of no-shows, optimise the scheduling process, and identify the current state of the art. It also describes ways to integrate advanced technologies such as patient management systems, mobile health apps, blockchain for secure data exchange and artificial intelligence (AI) for predictive analytics. *Findings/Originality of the research* - Correctly identifying whether scheduled patients will attend or miss their appointments allows clinics to strategically schedule patients, minimising the negative impact of patient no-shows. The number of patient no-shows in healthcare tourism and the constant search for solutions to minimise them demonstrate the difficulty of this problem and the need for further research. **Keywords** patient no-show, patient cancellation, health tourism, electronic solution for no-show, no-show statistics

Review

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INTRODUCTION

With health tourism growing at an unprecedented rate due to medical technology and increased awareness of the possibilities of international healthcare, effective management of no-shows has become essential. According to Barać Miftarević (2022), “Medical tourism has become one of the fastest growing industries worldwide, with an annual growth of 25% and a value of over 200 billion euros. North America, Asia and Europe account for the largest share of this value. According to The Medical Tourism Market – Global Industry Analysis Report, the projected value will be \$272.70 billion by 2027.” As patients increasingly cross borders, no-shows and unexplained patient cancellations have evolved from relatively minor scheduling issues to a significant operational and financial burden for healthcare providers. These no-shows result in underutilization of centre resources, economic impact on centre infrastructure improvements, loss of revenue for health centres, and an increase in patient waiting lists (Carreras-García et al., 2020). They disrupt the planned allocation of medical resources and lead to low patient satisfaction. Tower Family Healthcare reported that in February 2024 alone, 430 patients missed their appointments, resulting in a loss of 115 hours of clinical time (February 2024 – Missed Appointments – Tower Family Healthcare, n.d.).

According to Zion Market Research, the global medical tourism market was worth around USD 12.07 billion in 2023 and is expected to grow to around USD 86.78 billion by 2032, with a compound annual growth rate (CAGR) of around 24.5% between 2024 and 2032 (Research & Research, 2024). Given that missed appointments cost the healthcare industry more than \$150 billion annually (Morse, n.d.), this article aims to explore potential ways to address issues related to patient no-shows in the context of healthcare tourism. This will utilise current technological innovations such as complex patient management systems, mobile healthcare (mhealth) applications, secured blockchain technology, and artificial intelligence (AI) predictions that can serve as a basis for reducing the negative impact resulting from patient no-shows.

Thus, based on the study of selected available literature and many years of experience in dealing with the problem of “no-shows and unexplained cancellations of patients in health tourism” in medical business practise, this article deals with the possibilities of solving the above-mentioned problem by applying the possibilities of modern information and communication technology.

1. HEALTH TOURISM AND INFORMATION TECHNOLOGY

In the digital age, information technology has become synonymous with efficiency, innovation and progress in various industries. These digital tools include various types of online platforms, systems and applications that are used to solve problems, improve processes and create value electronically. They range from software applications and mobile apps to artificial intelligence (AI), blockchain technology and Internet of Things (IoT) devices. They are changing traditional ways of working by making them more efficient, flexible and adaptable to the ever-changing needs of companies, customers and entire societies.

In the business world, they streamline operations, automate repetitive tasks and provide strategic insights through data analytics, enabling companies to make informed decisions. For consumers, electronic solutions offer convenience, accessibility and personalized experiences, whether through e-commerce platforms, digital banking or smart home appliances.

Healthcare has also been transformed by telemedicine platforms such as wearable health devices, home health monitoring devices or even medical alert systems, which have made healthcare more accessible and personalized than ever before. The education sector has also introduced e-learning platforms that allow students to attend virtual classrooms even if they live thousands of miles away from their campus and have all the materials at their fingertips.

How can information technology help? There are several important ways in which these forms of solutions overcome challenges while creating opportunities:

- *Efficiency and productivity:* automation minimizes manual effort by digitizing processes, leading to higher productivity and lower costs.
- *Data-driven insights:* The ability to collect, analyse and interpret big data allows companies to manage large amounts of data, leading to better decisions.
- *Accessibility & Inclusion:* Digital inclusion means that information, products and services are made accessible to more people via online platforms.
- *Innovation & Competitive Advantage:* Keeping up to date with the latest digital technologies leads to innovative products and services that give companies an edge over the competition.
- *Environmental sustainability:* Digital systems ensure that resources are used optimally and waste is reduced through intelligent management based on relevant data.

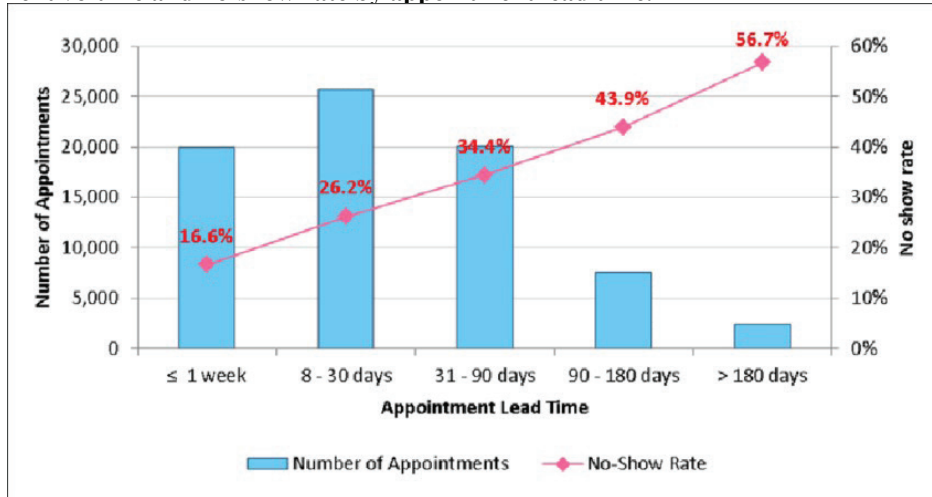
The future direction of healthcare tourism will depend on patient-centric, technology-enabled solutions that promise improved efficiency, patient confidence and successful global delivery of healthcare services to international customers.

2. PATIENT MANAGEMENT SYSTEMS

In the healthcare industry, as in any industry, managing appointments is a major challenge for both patients and providers. There are numerous reasons for rescheduled appointments, chief among them: forgetting (27%), transportation issues (21%), and missed work (14%) (Samuels et al., 2015). When it comes to rescheduling, Gen Z and Gen X millennials have different levels of patience when it comes to rescheduling (The Survey Says: Patient and Provider Perspectives on Appointment Scheduling in Healthcare, n.d.). Gen Z has the highest rate of appointment cancellations, followed closely by Millennials at 47%. Baby Boomers inform practises of appointment cancellations 98% of the time, while 26% of Gen Z miss appointments without informing the practise. 82% of Gen Z said they would be more likely to show up for an appointment if they could reschedule online, followed by Millennials at 81% and Gen X at 77%. (The Top Reasons Patients No-show or Cancel, n.d.). A survey conducted by Tebra shows that 71% of patients say that offering more same-day or next-day appointments would help prevent no-shows, cancellations and rescheduling. On the other hand, 68% of healthcare providers say they have to cancel or reschedule an appointment between one and ten times per month (Stats You Need to Know About Patient Cancellations and No-shows, n.d.).

A study published in the journal Risk Management and Healthcare Policy shows that the lead time, i.e. the waiting time between the day the appointment is made and the day of the appointment, correlates positively with the likelihood that the appointment will not be kept. If the lead time is more than two weeks, the likelihood of an appointment being missed, cancelled or rescheduled increases “significantly” 75% of patients say that they would be more likely to show up for their appointment if they could reschedule it online. On the other hand, 42% of patients surveyed said they would switch providers after rescheduling an appointment just 2 times (The Survey Says: Patient and Provider Perspectives on Appointment Scheduling in Healthcare, n.d.).

Graph 1: Appointment volume and no-show rate by appointment lead time.



Source: Chua & Chow (2018).

The data and findings of these studies and surveys point to the urgent need for innovation in healthcare planning. It is becoming apparent that alternative options which offer more flexibility, such as more same-day or next-day appointments, are an effective tool to reduce no-shows and cancellations as well as rescheduled appointments. In addition, these changes could lead to higher patient satisfaction and loyalty, especially among the younger generation who value convenience and speed in everything they do. No-shows and unexplained cancellations have several negative effects, such as underutilised resources, financial losses, disrupted schedules, and consequences for patient well-being when necessary treatments are postponed (Heung et al., 2022). Various factors contribute to these no-shows, including logistical challenges, financial constraints, sudden changes in health status, or patient anxiety (Snyder et al., 2022). With the expansion of electronic solutions in healthcare tourism, it is necessary to utilise technology that can simplify processes, improve patient satisfaction, and ultimately reduce no-shows and cancellations from patients who do not provide a reason. This is not just about removing the complexity of managing and delivering healthcare services, but also about solving specific problems faced by patients from abroad. Various electronic solutions can be key to achieving these goals.

Advanced Patient Management Systems (APMS) are comprehensive, sophisticated systems that go beyond simple appointment scheduling. They include a comprehensive view of the patient journey that provides real-time updates on appointments, treatment plans or other changes and alerts relevant to the patient's treatment or itinerary. They integrate pre-arrival discussions, transmission of medical history and records, appointment schedules, pre-arrival preparations (e.g. visa processing, travel and accommodation arrangements), flight details, itineraries, local transportation and any leisure activities the patient might undertake. It also takes care of the patient's post-treatment care, including aftercare, recovery monitoring and further consultations if required. Features such as real-time alerts, multilingual support and interoperability with wearable devices used to continuously monitor a person's wellbeing help the patient have a seamless experience, resulting in less anxiety and uncertainty that can lead to cancellations.

3. AUTOMATISATIONS

Automatic appointment reminders - The systems can send reminders via email, SMS or mobile app notifications at various intervals before the appointment. This has been proven to minimize non-attendance by keeping the appointment in the patient's mind and giving them enough time to cancel or reschedule. Research by Tebra found that 79% of doctors surveyed use digital appointment reminders to reduce missed appointments, and 40% of patients surveyed believe that more reminders would help. (The survey states: Patient and Provider Perspectives on Appointment Scheduling in Healthcare, n.d.)

Online scheduling systems - Patients don't have to call during working hours as they can easily book, cancel or reschedule their appointments through internet-based booking systems. This flexibility helps to reduce unexplained appointment cancellations as patients feel in control of their bookings.

Table 3: Online booking data on appointment scheduling from 2020.

Reason	Number / percentage
Prefer to book appointments online	43%
Virtual care access as a highly important factor when selecting a provider	40%
Refer to schedule appointments by phone	48%
Patients prefer to book online	43%

Online booking's requirement as a disadvantage	27%
Going online when searching for a new healthcare provider	57%
Online appointment booking platforms encourage patients to keep appointments	72% of patients and 60% of healthcare professionals
Non-attendance for patients who receive email reminders	35%

Source: (Eira, 2024)

4. PAYMENTS

A study in the US estimated the cost of 146,358 no-shows (a rate of 14.2%) across all clinics at a single medical centre in 2008, calculating a loss of \$196 per missed appointment with marginal cost of \$28.66 million (Kheirkhah et al., 2015). In September 2023, Tebra conducted an online survey of 1,075 patients and 204 mixed healthcare providers to assess patient and provider behaviour related to rescheduled appointments, cancellations, and no-shows. Patient cancellations and no-shows cost the surveyed practises up to \$7,500 per month. This equates to a loss of approximately \$375 per patient (59% of patients surveyed reported having cancelled or no-showed an appointment in the past 12 months) (*The Survey Says: Patient and Provider Perspectives on Appointment Scheduling in Healthcare, n.d.*).

Table 1: Cost of No-Show

SURVEY	NO-SHOW RATE	PER PATIENT	TOTAL
Tebra	5%	\$375	\$7,500 per month
Kheirkhah	14,2%	\$196	\$28.66 million per year

Source: Author (according to Tebra, Kheirkhah)

It should be noted that no-show rates vary according to geographical location and specific subspecialty of medical service. A systematic review of 105 papers found that the average no-show rate was 23%, with those from Africa being the highest at 43.0% and those from Europe and Oceania the lowest at 19.3% and 13.2% respectively. These figures illustrate the global nature of the no-show problem, but also point to regional differences that need to be taken into account when developing targeted solutions. (Leibner et al., 2023). To tackle the problem of patient no-shows, the Israeli government has made an innovative attempt by proposing legislation that encourages the system of co-payment when booking appointments. "The motivation behind this policy is that incentives are created for a patient to cancel rather than not attend an appointment in order to improve access while ensuring efficient utilization of healthcare resources" (Leibner et al., 2023).

4.1. Online Payment and Financing Integration

The integration of secure and user-friendly online payment and financing options is of paramount importance in the field of health tourism. This system, designed for multiple currencies and different payment methods, is a crucial aspect of accessibility and convenience for patients. A comprehensive financial infrastructure that not only simplifies the payment process but also accepts multiple currencies and offers flexible financing options should be considered. This could include straightforward credit arrangements or instalment plans that make quality healthcare services more affordable to a wider audience. Financial transparency and flexibility in this regard has already been identified as a major stress point for many health tourists, making access to treatment more difficult and ultimately leading to cancellations due to financial concerns.

4.2. Prepayments and Deposits

If you ask for a financial commitment at the time of booking, patients are more likely to keep scheduled appointments or cancel in time if their plans change. According to Tebra's survey, 68% of patients said they have never shown up for an appointment they were planning to cancel because they were afraid they would be charged a no-show fee, and more than half (52%) of patients said they didn't think it was fair if they were charged a no-show or cancellation fee (*The Survey Says: Patient and Provider Perspectives on Appointment Scheduling in Healthcare, n.d.*). Therefore, this approach is dependent on the flexibility of reimbursement and rescheduling policies offered by providers. Clear, fair and patient-friendly policies must be established to govern reimbursements or allow rescheduling of appointments without significant penalties.

5. ARTIFICIAL INTELLIGENCE (AI)

Artificial intelligence (AI), through data analytics, predictive modelling and automation, offers powerful solutions which are able to detect patterns that indicate the likelihood of missing certain appointments or reservations. Some AI solutions are:

Predictive analytics - AI is able to examine extensive data sets, such as appointment history, patient demographics, communication preferences and even external aspects, such as weather conditions or transportation issues, to predict whether or not patients will show up. Using this information, predictive models help forecast which patients are most likely to miss some visits by detecting trends and patterns.

Automated communication strategies - Specially sent reminders via SMS messages or application notifications that are tailored to the customer's preferences can significantly increase the attendance rate. Personalization means that artificial intelligence determines the optimal time intervals between reminders, including the preferred delivery method, based on individual preferences, ensuring punctuality and efficiency.

Dynamic scheduling systems - When predicting no-shows, AI improves scheduling systems by dynamically adjusting appointment slots. For example, if there is a certain time when the number of no-shows is higher than other times, this can lead to overbooking during that time, similar to how airlines deal with overbooking.

Personalized engagement - By tailoring messages based on the patient's medical history, including preferences or treatment plans, AI makes interactions more engaging, increasing the likelihood of participation. In healthcare, for example, AI could provide disease-specific instructions or health tips before a doctor's visit to make the patient feel valued.

Personalized intervention strategies - A staff member can call patients personally or offer transportation service to those who say they can not come and are far away, as well as other informational materials about the importance of the appointment. By addressing these issues directly, tailored interventions can help to effectively reduce the number of no-shows.

Feedback loops and continuous improvement - The AI system includes feedback loops in which the data from all visits, regardless of whether the visits are completed or not, is fed into a predictive model. Through this process, AI accuracy is continuously monitored and adjusted. This ensures that the approach to reducing no-shows evolves in response to changing patterns and behaviours.

Virtual appointments - Sometimes patients cannot appear on site. In this case, AI can ease the transition to virtual appointments. By predicting which appointments cannot be attended due to logistical issues, AI can suggest converting these to telehealth sessions where appropriate, reducing barriers to attendance.

6. TELEHEALTH

Telemedicine encompasses a variety of methods such as virtual consultations and video conferencing, data sharing and remote monitoring, eliminating the need for physical presence in healthcare facilities. This can offer key benefits, particularly for patients in remote areas, with mobility issues or who need convenient care options. Remote monitoring of patients through telemedicine, including pre-visit consultations and post-visit follow-up, significantly reduces the need for physical attendance, which in turn leads to reduced non-show at initial consultations. In addition, virtual consultations can help in obtaining second opinions to mitigate the cases where patients cancel because they are not sure if their treatment plan is the right one or in case of force majeure, e.g. COVID pandemic.

Table 2: Online booking data on telehealth during COVID pandemic:

Reason	Number / percentage	Time period
Cancelled appointments converted to phone or video appointments	1.1 million	from March 15, 2020, through May 1, 2020
Virtual appointments completed	2.8 million	during March and April 2020
Rate increase in the number of telehealth visits	50%	during the first quarter of 2020
Increase in telehealth visits	154%	during the last week of March 2020.
Telehealth patients sought care for conditions other than COVID-19	93%	
Telehealth encounters involving children less than five years old	3.5%	in 2020
Telehealth patients managed at home	69%	during the early pandemic period

Source: (Eira, 2024)

Virtual consultations - The use of telemedicine technologies for initial consultations can reduce non-attendance rates by eliminating travel-related issues such as the cost of the first visit. It also enables virtual consultations and even some treatments that can be carried out remotely. This could be particularly helpful for international patients, as they can start their treatment before they travel and continue it when they return home, improving the relationship between patient and doctor.

Integration of wearable health devices - The integration of wearable health devices helps with the continuous real-time monitoring of a patient's health status, vital signs and recovery progress. This data can be automatically uploaded to the patient's record so that healthcare providers have up-to-date information. This information can assist them in treating patients by providing personalised advice, changing the patient's treatment plan or even identifying potential health issues before they develop into serious conditions. With the ability to monitor remotely, patients can travel safely while still being monitored by their medical team.

7. ELECTRONIC SOLUTIONS FOR MEDICAL RECORDS & MOBILE HEALTH APPS

Customized mobile health apps for medical tourists are multifunctional tools with numerous features designed to enhance a patient's experience. These include: Access to medical records (using advanced encryption methods and secure protocols), appointment reminders, teleconsultations, treatment plans and medication reminders, test results, doctor's notes and tips for better health. Apps also enable the secure, seamless exchange of information between healthcare organizations across borders, promoting continuity of care and supporting the creation of complete health profiles for each individual.

Consequently, patients' journey should be properly navigated through the use of GPS integration and local health regulations to help them adhere to their prescription plans as they explore an unfamiliar country. In other words, these are important tools that bring together doctors and patients who need logistical support or need to treat chronic conditions, even if they are geographically separated. Below are several mobile health apps that focus on health tourism to enhance the patient journey:

Personal health management APP - Patient-centric mobile platforms offer features such as medication reminders, self-monitoring (e.g. blood pressure monitoring), symptom control, etc. This is possible because the integration of wearable devices minimizes manual input, making real-time information easily accessible to both physicians and individual users.

APP for appointment scheduling and reminders - Mobile apps for the healthcare sector offer the option of scheduling, rescheduling or cancelling appointments directly via an application. The automatic notifications about upcoming visits help patients not to forget them.

Multilingual support APP - The use of multilingual mobile health apps is of great importance as it ensures that non-English speakers can communicate with medical providers. This removes the language barrier, which is the main cause of misunderstandings between patients' instructions on how to use a mobile health app, the findings or other diagnostics they need to perform before visiting a doctor, or how to use their prescriptions.

APP for integrating payments and insurance - By integrating these functions directly into the app, all financial aspects of health tourism can be simplified. For example, with this tool you can easily check the costs of treatment procedures, pay them or apply for insurance claims via your smartphone. In this way, both administrative costs and unexpected expenses for tourists are significantly reduced.

Localized information and service APP - Such apps can provide, for example, information about nearby pharmacies or hospitals, emergency numbers and cultural specifics for foreigners traveling abroad. This is important for those who find themselves in a foreign country where they don't even understand the language, let alone know where to turn if they need help.

Feedback and support app - Mobile health apps often have features that allow patients to give feedback or ask for help. This open communication between the healthcare provider and the patient is a great way to get quick answers to any concerns, improve service quality and increase patient engagement and satisfaction.

Personalized health content APP - Providing personalized health content, such as articles, videos and tips on a specific condition or treatment, can also help to engage and educate patients. Such targeted information can empower patients to better self-manage their conditions, adhere to treatment plans and make informed decisions about their treatment.

8. BLOCKCHAIN

A blockchain is a decentralized, distributed and public digital ledger used to record transactions across many computers so that the record cannot be changed retroactively without changing all subsequent blocks and the consensus of the network (What Is Blockchain and How Does It Work? | Synopsys, n.d.). Blockchain technology offers an innovative approach to securing data that securely implements an efficient, seamless flow of medical information across borders. Blockchain, as a decentralized ledger technology (DLT), stores data on a network of computers around the world, making it nearly impossible to hack or tamper with. The introduction of this technology can change the way healthcare data is stored and exchanged in health tourism. A complete health record can be accessed globally by patients and providers with limited access, ensuring continuity of care while reducing administrative delays/errors. However, blockchain also presents some challenges, from major infrastructural requirements to the need for interoperability standards and legal and regulatory considerations, including patient consent for the use of blockchain in their medical records. Below you will find the benefits of blockchain technology:

Decentralization and security - One of the key aspects that sets blockchain apart from other systems is its decentralized nature. Unlike traditional databases, where data is located in a centralized location, blockchain has many nodes (computers), which makes it resistant to cyberattacks and data loss. Each block contains multiple transactions. Among them, some encrypted transactions are linked to the previous one, creating a chain that cannot be interrupted.

Immutable records - Once a transaction has been carried out by this system, e.g. by recording it in blocks or adding it to chains, there is no way of changing or deleting it afterwards. This helps to ensure that treatment histories, patient consent forms and medical records remain accurate over time, serving as an authentic source for doctors and clients.

Enhanced privacy and patient control - In addition, blockchain can give patients greater control over their personal medical information by simply using private keys - in the form of digital signatures - that allow individuals to decide who can access their records. Patients can grant or deny access to medical information at will, which plays a big role in protecting their private data.

Interoperability and continuity of care - Blockchain can enable the sharing of patient data between many healthcare systems, regardless of where the patient is from; a doctor still has access to important patient data to improve their service. This seamless flow of data supports continuity of treatment, especially for complex medical procedures associated with health tourism.

Smart contracts for automated reviews - Smart contracts are digital contracts stored on a blockchain that are automatically executed when certain conditions are met (What Are Smart Contracts on Blockchain? | IBM, n.d.). They could be used in insurance coverage verification, payment processing and medical compliance without the need for manual assistance. Automating these processes can speed up administrative procedures, minimize errors and increase efficiency in cross-border healthcare services.

9. “OUT OF THE BOX” SOLUTIONS

Unconventional solutions to reduce no-shows and unexplained patient cancellations in health tourism should aim to address the root causes of these issues in innovative ways, improve patient engagement and overcome logistical challenges. Below are some unique approaches that could have a significant impact:

Gamifying the patient journey - Gamifying the patient journey can significantly improve engagement and retention. A healthcare provider can reward patients by offering them points, badges or discounts. For example: showing up on time for consultations, completing documents before the visit or participating in health exercises before treatment.

Flexible, individualized scheduling - Using AI and machine learning algorithms, you can offer personalized scheduling options by analysing patient behaviour patterns and preferences as well as external factors (such as local events or weather conditions) to suggest the optimal appointment times.

Social Commitment Contracts - Taking behavioural economics into account, health tourism providers could use social commitment contracts, where patients can publicly commit to their appointments, e.g. on Facebook. The public declaration increases individual interest through social pressure and personal responsibility, thus reducing the number of non-shows.

Integrated health packages - For many health tourists, travel logistics are added to their health needs. Combining healthcare appointments with travel arrangements (flight, accommodation, local transportation) in integrated packages would be a big win for patients who would otherwise face significant logistical hurdles. Providers could use technology platforms to synchronize medical appointments or work with travel agents to create seamless experiences that minimize cancellations due to travel inconveniences.

Virtual Reality Previsits - Virtual Reality (VR) tours prior to visiting the facility, where medical staff are introduced, could also help ease anxiety about the facility. It also allows you to build a relationship with the provider before you arrive. If you have built a bond this way, it will be more difficult for patients to cancel and they will be less likely to follow through with their treatment plans unfinished.

Emergency Contingency Plans - A clear and easy-to-use contingency plan for emergencies or sudden changes, including flexible rebooking options or virtual consultation alternatives, can help maintain patient engagement even when unexpected circumstances arise. This could include a “guarantee” program where patients can rebook for free in the event of a legitimate emergency to reassure them and potentially reduce unexplained cancellations.

Community support groups - Patient communities, either set up or promoted online or locally, can provide support and encouragement from like-minded people going through the same health journey. Such peer encouragement motivates patients to keep their appointments and follow their treatment plans, reducing the number of no-shows.

Predictive analytics for personalized interventions - Identifying patients who are highly likely to miss an appointment using predictive analytics and then providing personalized interventions could completely change this problem. These interventions could include personalized reminders from the doctor, additional treatments or even phone calls. This ensures that resources are used as effectively as possible.

Other industries - In addition to healthcare, several other industries have already developed innovative and efficient approaches to dealing with no-shows and cancellations. This will help us understand some of the adaptable solutions for health tourism:

Dynamic pricing and demand forecasting by airlines - The airline industry uses dynamic pricing and advanced demand forecasting algorithms to manage booking capacity and minimize losses due to no-shows. Pricing is adjusted in real time depending on customer behaviour, demand and purchasing patterns, allowing airlines to optimize revenue while reducing empty seats. These strategies could also be applied to health tourism, where prices for treatments or services can vary depending on seasonality of demand, booking lead times and other factors to achieve engagement.

Overbooking strategies in the hospitality industry - Hotels and other hospitality businesses often book additional rooms in the expectation that a certain number of guests will not show up, relying on empirical data. Especially in healthcare, data must be collected with caution before determining the extent of buffer time that walk-ins or last-minute appointments can accommodate; they would only be filled by pre-booked appointments that are cancelled.

Real-time adjustment of ride-sharing services by transportation services - Companies such as Uber and Lyft adjust their transportation services to immediate demand, e.g. pricing or driver availability. Similar real-time management systems could help health tourism providers to adjust their schedules in real time due to sudden developments such as cancellations or online reservations.

Subscription models from the entertainment and software industry - Subscription models such as Netflix or Adobe Creative Cloud allow continuous access for a regular fee, mitigating the impact of one-off non-use. Healthcare tourism could consider introducing subscription/membership models where patients receive a bundle of services/consultations/follow-up treatments, incentivizing ongoing interactions while reducing the relative costs associated with non-use of appointments.

Deposit and tiered access from event management - Event organizers sell tickets at different prices and offer VIP or early access to those who buy more expensive tickets, while free events charge a deposit that is refundable only upon attendance. Applying this model to health tourism would be a tiered access system for appointments, where higher fees/deposits would indicate preferential appointment allocation or additional amenities to encourage engagement.

Gamified loyalty programs in retail - Gamified loyalty programs are used by retailers and service providers to drive repeat business and engagement. In health tourism, loyalty programs with gamified elements could be developed where patients earn points for each appointment, treatment or healthy habit, which they can later exchange for other services, discounts or other benefits.

Tailored offers and recommendations through AI in e-commerce - E-commerce giants such as Amazon are using AI to personalize shopping experiences through recommendations based on users' previous behaviour and preferences. A personalized communication service using AI for health tourism and tailored care packages are important because they make the patient feel valued, gaining their trust in the appointment they have already made.

Virtual queuing systems of Amusement parks - Virtual queuing systems (VQS) have been adopted by amusement parks where visitors can book rides in advance to spend less time in queues. In the context of healthcare tourism, such a system could reduce the waiting time of patients seeking a consultation or treatment, improving the overall hospital experience.

Loyalty programs - Loyalty programs, similar to those in the hotel industry, are designed to encourage repeat visits while reducing cancellation rates. Therefore, medical travel companies can implement similar rewards programs that reward patients who keep their appointments with discounts or priority scheduling for subsequent services.

Real-time communication platforms - Also a solution from the hotel industry, real-time communication platforms can be used in the medical tourism sector by accompanying patients from booking to check-out to keep them engaged and informed.

Adapting these "out-of-the-box" solutions from other industries could provide health tourism with innovative ways to reduce no-shows and cancellations, ultimately increasing efficiency and patient satisfaction.

CONCLUSION

In health tourism, the problem of reducing no-shows and unexplained cancellations requires a holistic approach and comprehensive strategies that combine advanced technology solutions to improve patient engagement and retention. It's about creating a high-tech ecosystem that's all about the patient. With patient management systems, mobile apps, blockchain for data

security and AI for predictive analytics, providers can reduce no-shows and increase patient satisfaction. By implementing electronic scheduling options such as automated reminders, online appointment scheduling, prepayment policies and virtual consultations, health providers can reduce the financial and operational impact of missed appointments. The use of these technologies is more than just a measure to curb patient no-shows, but a deliberate move to redefine the patient experience in health tourism. In other words, it is a continuous process of innovation, adaptation and collaboration to reduce no shows and improve patient satisfaction in the medical travel industry. Sustainability and success therefore depend on strategies changing over time, as this sector transforms from one phase to the next into something completely different. Based on the analysis of the available world literature on the problem addressed in the paper and the facts and data presented, it can be concluded that the problem of no-shows and unexplained cancellations of booked services/treatments could be reduced or mitigated by better integration of the numerous possibilities and solutions offered by modern information and communication technology. This is evidenced by hypothesis H1 stated in the introduction of this paper. All of these recommendations in this paper are intended to provide a direction on which future research can focus. Health tourism can only reach its full potential if it is strategically integrated with technological advancements and patient engagement is at its core. This will create an environment that provides health tourists around the world with the experience of a lifetime that is seamless, safe and satisfying.

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