

NapoliSana Campania

ORGANO UFFICIALE ORDINE DEGLI INFERMIERI DI NAPOLI
Anno XXIX - n° 3 - Settembre 2023

INSC
Nursing
Inserto di ricerca infermieristica
pp. 33-138



**Tagli al Pnrr,
la sanità territoriale
perde pezzi**

**28 APRILE
2023**

**GIORNATA
MONDIALE
PER LA
SALUTE E LA
SICUREZZA
SUL LAVORO**



www.patronato.acli.it



Per i servizi sociali dei lavoratori e dei cittadini

Serve una nuova visione



“ Servono soldi, non c'è dubbio. L'Italia è tra le nazioni dell'occidente quella che spende meno per la salute: siamo sotto la media Ocse di circa 13 miliardi di euro e siamo i primi tra i paesi poveri (spendono meno di noi i paesi dell'Europa dell'est – Repubblica Ceca a parte – e del Sud - Spagna, Portogallo e Grecia). Servono soldi per allinearci agli investimenti di Francia e Germania (30/40 mld), soldi per ammodernare strutture, rinnovare le tecnologie, aumentare i posti letto, pagare meglio i professionisti, infermieri in testa. Si parla di una richiesta di 4 miliardi da parte del ministro Schillaci avanzata in Consiglio dei ministri. Ma in questo momento il vero problema non è tanto definire l'entità dei fondi che pure servono. Perché è come mettere una pezza per coprire il buco. Ed è quello che faremo, rincorrendo ancora una volta l'emergenza. Ma prima ancora di stabilire quanto investire, la sanità italiana ha bisogno di un progetto, di un piano, di una visione. Proprio come successe nel lontano 1978 quando, sulla spinta della lotta per i diritti civili, partì il Sistema sanitario nazionale. Una grande conquista allora. E che a tutt'oggi, nonostante le varie riforme e modifiche a cui è stato sottoposto negli ultimi quarant'anni, continua a mantenere saldi e validi i suoi principi di base sanciti dalla legge 833/1978: **Universalità, Ugualianza, Equità**. Una grande riforma sociale nata dalle grandi lotte sul diritto alla salute degli anni '60 e '70. Ecco la nuova sanità deve avere un nuovo principio ispiratore. E questo non può che essere il cittadino, i nuovi bisogni di salute mutati dal lontano 1978 e mai affrontati. Oggi il problema dell'universalità si ripropone con il crescente invecchiamento della popolazione italiana e si correla a un aumento esponenziale delle malattie croniche e quindi della domanda di salute, che spesso non trova risposte in una sanità pubblica ostinata nell'inseguire come modello il processo di aziendalizzazione avviato dagli anni '90 e che è miseramente fallito. Se gli obiettivi erano quelli del miglioramento della qualità attraverso la competizione dei soggetti erogatori e della efficientizzazione della spesa attraverso gli strumenti in uso nelle aziende in private, questi non sono stati raggiunti neanche in minima parte. Anzi. Si è già creata una sanità di serie A al Nord e una sanità di serie B al Sud. E ora, con l'autonomia differenziata, si rischia di al-

largare ulteriormente la forbice. Motivo che da solo rende inaccettabile ogni ipotesi di frammentare ulteriormente l'assistenza sanitaria conferendo alle regioni competenze esclusive in ambito sanitario.

Il Ssn ha bisogno di essere riscritto conservando integri i suoi principi ispiratori, ma adeguandosi alle nuove esigenze dei cittadini, in risposta ad una evoluta e complessa domanda sanitaria. Dalla capacità di garantire assistenza sul territorio, anche per far fronte a picchi emergenziali e mitigare la pressione sugli ospedali, fino alla capacità di dare risposte assistenziali sulle patologie croniche, invalidanti che richiedono poche e puntuali prestazioni cliniche e lunghe stagioni assistenziali, che necessitano di più infermieri e operatori socio-sanitari e meno medici. E non è un caso se, riprendendo quanto emerso dall'ultimo rapporto Crea, “Dove le performance regionali sono peggiori è maggiore la carenza di infermieri”.

Ecco le frontiere più avanzate della nuova sanità in cui gli infermieri sono portatori di soluzioni efficaci e sostenibili. Dagli infermieri arrivano quindi risorse decisive per colmare nel prossimo futuro il gap tra quantità e qualità dei fabbisogni sanitari e sociosanitari da un lato e matrice dell'offerta di servizi e prestazioni dall'altro. È indispensabile allora abbandonare consolidati modelli di servizio e organizzativi resi obsoleti dalle nuove domande di salute e ormai inefficaci per rispondere alle esigenze della popolazione, come dimostra anche l'analisi Crea Sanità. Il nuovo paradigma sanitario si fonda sulla costruzione di reti di prossimità territoriale, determinando uno spostamento dei setting assistenziali dai luoghi tradizionali di cura, come gli ospedali, verso strutture territoriali, compresi i domicili, che possano favorire l'integrazione sociosanitaria e la continuità dei percorsi. E allora, chiarito questo aspetto, noi infermieri sappiamo come investire i fondi chiesti dal ministro Schillaci.

Indubbiamente, rilanciando le politiche sul capitale umano per rendere più attrattive tutte le professioni sanitarie, infermieri in testa: rinnovare i contratti, eliminare il tetto di spesa per il personale sanitario, prevedere specifiche incentivazioni (non solo economiche) per quelle specialità oggi disertate, in primis la sanità d'urgenza. Perché se crolla il capitale umano, finisce il Servizio sanitario nazionale.

di Teresa Rea

l'editoriale

NapoliSana Campania

Supplemento di Napolisana

Rivista periodica di aggiornamenti professionali, attualità, cultura e ricerca infermieristica

Organo dell'Ordine delle professioni infermieristiche di Napoli

ANNO XXIX - N. 3 - settembre 2023

AUTORIZZAZIONE DEL TRIBUNALE DI NAPOLI N. 4681 DEL 27/9/1995

Dati indicizzazione - ISSN 2611-2205 Napolisana Campania

Direttore editoriale

Teresa Rea

Direttore responsabile

Pino de Martino

Caporedattore Comitato Scientifico

Ph. D. Teresa Rea

Comitato Scientifico

Dott.ssa Margherita Ascione; Michela Barisone, Ph. D.; Dott.ssa Florinda Carcarino; Andrea Chirico, Ph. D.; Giancarlo Cicolini, Ph. D.; Dott.ssa Grazia Isabella Continisio; Alberto Dal Molin, RN, Ph.D.; Maria Rosaria Esposito, Ph.D.; Dott. Gianpaolo Gargiulo; Dott.ssa Lorenza Garrino; Joseph Giovannoni, Ph.D.; Assunta Guillari, Ph.D.; Loreana Macale, Ph.D. Antonella Mottola, Ph.D.; Dario Palladino, Ph. D.; Gianluca Pucciarelli, Ph. D.; Dott.ssa Franca Sarracino; Nicola Serra, Ph.D.; Silvio Simeone, Ph.D.

Hanno collaborato a questo numero

Anna Arnone, Dario de Martino, Sara Di Santo, Salvatore Errico, Sandro Libianchi, Giuseppe Marcucci, Maurizio Musolino, Ada Silvestri

Editore, Direzione e Redazione:

Opi Napoli - P.zza Carità 32 - Cap 80134 Napoli

Tel: +39 081 440140 - 081 440175 - Fax: +39 081 0107708

Email: info@opinapoli.it

Email certificata: napoli@cert.ordine-opi.it

RESP. GRAFICA E IMPAGINAZIONE

POLIGRAFICA F.LLI ARIELLO - EDITORI S.A.S. - NAPOLI

Corso Amedeo di Savoia, 172 - Tel. 5441323

La riproduzione e la ristampa anche parziali di articoli e immagini del giornale sono formalmente vietate senza la debita autorizzazione dell'editore.

in questo numero



L'EDITORIALE di Teresa Rea

3



**Serve
una
nuova
visione**

Primo piano

6-7

Tagli al Pnrr, la salute sul territorio perde pezzi

6

Rea: "Diciamo NO ad una sanità dei ricchi e dei poveri"

7

Laboratorio Sanità**8-13**

Pochi soldi, tante criticità e qualche eccellenza	8
Agenas, la Campania leader in tecnologie e innovazione	8
"Da 20 anni veniamo derubati di 300 mln di euro"	10
Posti letto, Campania fanalino di coda	11
L'infermiere di famiglia nelle Aggregazioni funzionali territoriali	12
Cure primarie e un nuovo paradigma assistenziale	12

Politica sanitaria**14-17**

Liste d'attesa, 22 mln per recuperare il terreno perso	14
Gimbe: "Per le attività sanitarie post covid Campania all'ultimo posto"	14
"Dove le prestazioni sono peggiori è maggiore la carenza d'infermieri"	16
L'Italia si fa in tre. Tra Regioni promosse, rimandate e quelle bocciate	17

Il presidente De Luca a casa degli infermieri**18-19**

"Dateci una mano sugli screening e per abbattere le liste d'attesa"	18
"Accolto il nostro appello, più valore alla professione"	18

OpiNapoli informa**20**

Triage, lotta contro il tempo: l'esperienza del Cardarelli	20
--	----

Dentro la professione**21**

Infermiere penitenziario: identità professionale, formazione e carriera	20
---	----

Revisioni e aggiornamenti**22-26**

"La pancreatectomia distale in chirurgia laparoscopia"	18
--	----

Ospedali & territori**27-32**

Castellammare, un ospedale al posto delle terme	27
A Napoli le radiografie anche domiciliari	28
Asl Napoli 2 Nord, un tour per la prevenzione	29
Tumori vie biliari, una speranza dal Pascale	30
Prima Tac aperta ad utenti esterni alla Napoli 3 Sud	31
Tangenziale di Napoli, installati i defibrillatori	31
L'ospedale Betania, un drappello di pubblica sicurezza	32
Ministero Salute Francesco Vaia nuovo direttore generale Prevenzione	32

NSC - Supplemento di ricerca infermieristica**33-138**

Evaluation of M-Health on Medication Adherence in Tuberculosis Patients: A Systematic Review	
Music Therapy for Pain and Anxiety in Hospitalized Children: A Systematic Review of Randomized Controlled Trial	
Healthy Nurses: Tips for Enhancing Mental, Emotional, and Spiritual Well-being	
Systems compared: Capillary glucose self-monitoring and Flash glucose monitoring system. Cross-sectional study	
Workplace Violence Experienced by Nurses in Northern Region Hospitals of Morocco: A Cross-Sectional Study	

Primo piano

Tagli al Pnrr, la salute sul territorio perde pezzi

Cade la scure del Governo su 49 ospedali di comunità in Campania. L'ira di De Luca: "Una rapina".

«La Campania – spiega il governatore – è la regione che avrebbe dovuto realizzare più case di comunità perché dobbiamo recuperare sulla sanità territoriale.

Abbiamo fatto la corsa per presentare i progetti. Ora ci dicono che si troveranno altri fondi».

di PINO DE MARTINO

«**C**i tagliano una cinquantina di case di comunità. È un atto di scorrettezza e di irresponsabilità». L'ira di Vincenzo De Luca col-pisce la modifica del Pnrr che il governo chiede all'Europa.

«Siamo di fronte a un disastro di proporzioni inimmaginabili», dice De Luca. «Si tagliano risorse per la sanità territoriale, è sconvolgente», continua il governatore. Già, perché il

Pnrr ha un capitolo sulla sanità territoriale destinato a creare ospedali e case di comunità: le strutture che dovrebbero aiutare a diminuire la pressione sugli ospedali, offrendo prestazioni e cure per malati non urgenti e per quella continuità terapeutica a basso costo che in Campania manca quasi del tutto.

IL PROGETTO - Sono 170 le case di comunità previste in Campania con il piano post pandemia: circa 411 milioni di euro il valore. Il taglio previsto dal ministro Fitto, dovrebbe interessare 49 case di comunità in regione per un valore di quasi 130 milioni. «La Campania - spiega De Luca - è la regione che avrebbe dovuto realizzare più case di comunità perché dobbiamo recuperare sulla sanità territoriale. Abbiamo fatto la corsa per presentare i progetti. Ora ci dicono che si troveranno altri fondi».

I FONDI - E proprio sul travaso dal Pnrr ad altre fonti di finanziamento, il governatore non le manda a dire: «Prendono i soldi dal fondo di sviluppo e coesione destinato al Sud. E così abbiamo una prima rapina clamorosa di risorse destinate al Mezzogiorno». Ancora: «Vogliono coprire le case di comunità con i fondi dell'articolo 20 che sono le risorse utilizzate per la manutenzione ordinaria e l'edilizia ospedaliera. Ma noi abbiamo una programmazione già conclusa per alcuni ospedali. Per esempio, il nuovo ospedale di Castellammare di Stabia, per il quale stiamo concludendo l'acquisto dell'area nelle Terme, quello di Nola e Sessa Aurunca, la nostra ipotesi era finanziarli proprio con i fondi dell'edilizia ospedaliera. Ora Fitto ci dice che quei soldi saranno presi per fare le case di comunità.

È sconvolgente. Vogliono utilizzare i fondi che servivano per fare i nostri ospedali». De Luca è tranchant: «In conclusione sul Pnrr, piano di resilienza, di rinascita, ad oggi non si è mossa una foglia». Anzi, ricorrendo anche ieri a una delle espressioni più care del presidente: «Come si dice dalle nostre parti, fumo con la manovella».



Rea: *“Diciamo NO ad una sanità dei ricchi e dei poveri”*

Tanti i dossier aperti presso l'Opi Napoli con la ripresa delle attività. Gli infermieri in allarme: “Preoccupati dal progetto per l'Autonomia differenziata e dal taglio per ospedali e case di comunità. Campania penalizzata ancora una volta”.

di DARIO DE MARTINO

“**A**nche quest'estate è stato dimostrato quanto diciamo da tempo: gli ingolfamenti nei pronto soccorso si risolvono con una sanità territoriale capace di assorbire quella domanda di salute che altrimenti viene riversata nei reparti di urgenza anche quando non ce ne sarebbe bisogno”.

Le cure di prossimità investono soltanto uno, magari il più importante, dei dossier che Teresa Rea, presidente dell'Ordine delle professioni infermieristiche di Napoli, intende riaprire da subito, dopo il rientro dalle ferie. Anche perché potrebbero ripetersi nei prossimi giorni le scene già viste a luglio, con i pronto soccorso super affollati in vista di un nuovo e incontrollato ingolfamento dei pronto soccorso. E poi perché, fin quando non ci sarà una sanità territoriale adeguatamente presidiata, le barelle nei corridoi dei pronto soccorso degli ospedali napoletani ci saranno sempre.

Presidente, anche quest'estate ha visto infermieri super impegnati nell'affrontare le emergenze.

“Sì - conferma la Rea - con grave disagio per gli assistiti e di super lavoro per gli infermieri, costretti a turni massacranti, rinunciando spesso a giornate di riposo e ferie. Andrebbero lodati come fa l'Opi di Napoli. Invece ricevono in cambio aggressioni, insulti, minacce. Ma è vero pure che oltre il 70 per cento delle richieste di assistenza erano codici bianchi e verdi. Cioè trattamenti sanitari a

bassa intensità trattabili anche a casa con l'infermiere di famiglia o in quelle strutture territoriali che oggi mancano. E che chissà se vedremo mai”.

In che senso, si spieghi.

“Con la modifica del Pnrr che il governo chiede all'Europa tagliano alla Campania una cinquantina di case di comunità. Si tagliano risorse per la sanità territoriale. Fondi destinati a ospedali e case di comunità: le strutture che dovrebbero aiutare a diminuire la pressione sugli ospedali, offrendo prestazioni e cure per malati non urgenti”.

Tra i dossier aperti dall'Opi Napoli c'è anche uno che riguarda l'autonomia differenziata. Cosa temete?

“Che si vada verso una sanità dei ricchi e dei poveri. Come sta già avvenendo in Lombardia con il caso dell'ambulatorio ad accesso diretto, che non è altro, nella dura e concreta realtà, di un pronto soccorso a pagamento, che offre servizi di prelievo a chiunque abbia la capacità economica di provvedere al saldo della cifra richiesta. Anche per questo bisogna puntare su soluzioni sostenibili per l'intero sistema”.

Cosa proponete?

“Per far fronte alle nuove domande di salute che arrivano da una popolazione sempre più anziana e con tante patologie legate all'età, servono soluzioni nuove. È indispensabile abbandonare modelli organizzativi obsoleti, ormai inefficaci per rispondere alle esigenze di salute della

popolazione, come dimostra anche l'analisi Crea Sanità. Il nuovo paradigma sanitario si fonda sulla costruzione di reti di prossimità territoriale, determinando uno spostamento dei setting assistenziali dai luoghi tradizionali di cura, come gli ospedali, verso strutture territoriali, compresi i domicili, che possano favorire l'integrazione sociosanitaria e la continuità dei percorsi”.





Pochi soldi, tante critiche

Secondo l'Agenzia nazionale per i servizi sanitari regionali (Agenas) "la Campania recupera posizioni e milioni di euro che riceve in meno ogni anno". De Luca incassa gli elogi, ma restano nodi, emergenze e sono gravati da eccessivi carichi di lavoro. Ne servono di più e con compiti che ne qualifichino e valoriz-

di PINO DE

La foto scattata a Città della scienza, nel corso della giornata dedicata al Laboratorio Sanità, restituisce una situazione in bilico tra efficienza e gravi ritardi, tra i tanti primati negativi e buone pratiche. E' stato lo stesso Governatore Vincenzo De Luca, a fine giornata, a fare la sintesi. Non senza l'ironia che lo contraddistingue e il parlar chiaro, in modo diretto, come piace a lui. O come gli piace che si dica di lui. Così, ai complimenti che Agenas ha voluto tributargli sul fronte dei bilanci e su altre eccellenze, (lo diciamo in dettaglio nelle pagine seguenti) ha aggiunto, contro ogni eccesso di vanagloria, i nodi che ci sono ancora da sciogliere, le criticità, i ritardi. Con una tirata d'orecchie ai direttori generali: «Bisogna lavorare ventre a terra sulle liste d'attesa ed evitare che un malato oncologico stia in fila sotto il sole per ritirare le medicine. Se fallite vi mando a casa».

LABORATORIO SANITÀ – «Gli infermieri di Napoli sono e saranno in prima linea sul tema dell'innovazione tecnologica e digitale nella sanità. Le nuove tecnologie dovranno servire per creare nuovi modelli di cura e per migliorare i percorsi esistenti. Per adesso sono gravati da eccessivi carichi di lavoro. Ne servono di più e con compiti che ne qualifichino e valorizzino il lavoro. soprattutto guardando a un'assistenza infermieristica incentrata sempre più sul paziente». Così Teresa Rea, presidente Opi Napoli, a margine del Laboratorio sanità ha chiarito la posizione degli infermieri di Napoli sul tema dell'innovazione. E' stata una giornata di dibattito a tutto campo, sulle nuove sfide della sanità. Per tutto il giorno, studi e incontri, con tavoli tematici sui problemi della salute e sui nuovi scenari organizzativi e di presa in carico. «Noi infermieri - ha aggiunto Teresa Rea - vogliamo so-

prattutto individuare e puntare sulle opportunità offerte dalla innovazione digitale e biomedica per il rilancio della sanità in Campania, la crescita professionale degli infermieri, il benessere del cittadino».

Il «Laboratorio» è stato promosso da Gutenberg, Fondazione per l'Innovazione e la Sicurezza in Sanità, con il patrocinio di Regione Campania, Conferenza delle Regioni e PA, Comune di Napoli, Age.na.s e Istituto Superiore della sanità, Asl e ospedali, Ordini professionali e altre associazioni di categoria. La giornata di studi e approfondimenti tenuta a Città della Scienza si è occupata soprattutto d'innovazione tecnologica e degli investimenti in digitalizzazione, come strumenti strategici per ridurre gli svantaggi tra Nord e Sud nel governo della Salute.

DIGITALE E INNOVAZIONE - Fari puntati dunque sulle possibilità offerte dagli investimenti in nuove tecnologie dal Pnrr, ovvero sulla Telesalute, Di-

Agenas, la Camp

Ospedale del Mare eccellenza sulle angio

(pdm) Per il direttore generale dell'Agenas, Domenico Mantoan, la Campania ha messo in campo «la maggiore quantità d'investimenti per tecnologia e innovazione». E giù con i dati alla mano a snocciolare le cifre che parlano di una sanità che in Campania, nonostante gli svantaggi, migliora e risale la china, mentre Emilia e Toscana, regioni benchmark, devono fare i conti con sbilanci saliti a 900 milioni e oltre 1,2 miliardi. Un dato significativo soprattutto considerando che la Campania perde ogni anno circa 500 milioni di finanziamenti che le spetterebbero, di cui 230 per il sottofinanziamento sull'assegnazione della quota pro-capite del fondo nazionale. Altri 250 per mobilità passiva dei pazienti che si recano in altre regioni per ricevere cure. Nonostante ciò alcuni indicatori dicono che la Campania è risalita nella classifica italiana con alcune eccellenze in discusse.

Ospedale del Mare - A tirare la volata sul fronte dei successi per capacità d'interventi ospedalieri - si legge in una nota - è l'Università Federico II che risulta essere la struttura con le migliori performance e guida con i suoi numeri impressionanti la crescita indiscutibile che ha fatto la Campania e alcune realtà come l'Ospedale del



Sanità e qualche eccellenza

ed è la regione più efficiente e virtuosa d'Italia per investimenti su nuove tecnologie, nonostante i 321 ritardi legati alle liste d'attesa, ai pronto soccorso, al personale, ai posti letto. Teresa Rea: *"Gli infermieri sfiniscono il lavoro. Con le nuove tecnologie si può migliorare la sanità e la qualità del lavoro infermieristico"*

MARTINO

igitalizzazione, Fascicolo sanitario elettronico, big-data e strumenti e apparecchiature elettroniche di ultima generazione in ausilio delle attività mediche e chirurgiche, in grado di migliorare i processi diagnostici e di accelerare sul fronte delle liste di attesa. Insomma, s'è trattata di un'importante occasione di confronto

sulle opportunità date dall'innovazione digitale e biomedica per il rilancio della Sanità in Campania e nelle altre regioni del Sud. «L'obiettivo – ha detto Vasco Iannotti presidente del forum risk management – è un confronto tra mondo della sanità, della ricerca e competenze tecnologiche per monitorare come può cambiare

la sanità e come questa può essere cantiere per lo sviluppo della ricerca e dell'innovazione. Il ruolo centrale spetta alle Aziende Sanitarie in rete con le Università e i Centri di ricerca e parchi tecnologici, per ottimizzare le opportunità d'innovazione nella governance delle risorse umane e nei percorsi clinici e assistenziali».

Campania leader in tecnologie e innovazione

plastiche. Bassi costi di produzione per effetto deficit personale e minori fondi dallo Stato

mare, che è il primo ospedale d'Italia per tempi di intervento nell'area cardio vascolare.

Crescono investimenti - «Tutto questo - ha continuato Mantoan - accade in una fase importante per il Paese che dopo il periodo di crescita degli investimenti in sanità dovuto all'emergenza covid, vede una continuità di fase espansiva con una crescita prevista di oltre 2 miliardi l'anno per il prossimo triennio. Nel periodo 2018-2021 il fondo nazionale sanità è cresciuto da 111 miliardi a 123 miliardi, ma sono rimaste le disegualianze nella ripartizione anche della crescita, infatti il fondo nazionale è cresciuto del + 10% mentre il riparto ha portato in Campania 881 milioni in più cioè solo l'8%, il che significa che mancano all'appello come importo di crescita 220 milioni solo per la crescita e 331 milioni per il dislivello dovuto ai criteri. Nel periodo 2018/2021 in Italia si osserva un aumento del valore pro-capite del finanziamento ordinario. La Regione Campania si attesta sempre su valori sotto la media, nonostante gli incrementi di valori al pari di tutte le regioni. Nello stesso arco temporale si è visto un aumento del finanziamento ordinario pro-capite 240,00 euro, mentre per la Campania è stato di 221,00 euro». Dalle tabelle

presentate dal direttore Agenas si evince che se tra i criteri di riparto venisse utilizzato quello del numero effettivo la Campania salirebbe nel contributo del fondo sanitario indistinto da 11,046 miliardi a 11,367 miliardi, con un incremento fisso annuale di 321 milioni di euro registrando così allo stato un minor finanziamento per ogni cittadino campano di 57,00 euro: «E anche se venisse utilizzato il criterio - più verosimile - 98% popolazione secca e indice di multicronicità e limitazioni gravi per maggiori di 75anni - la Campania recupererebbe 380 milioni di euro».

Bassi costi di produzione - Ecco alcuni dei dati Agenas del biennio 2021-2022: l'incremento dei costi di produzione pro-capite della Campania è tra i più bassi d'Italia con un meno 3 euro per cittadino spesi, una percentuale di riduzione del costo del personale del 3.32% mentre in Italia il costo del personale è sceso nello stesso periodo solo dell'1.29%. Infine sempre in tema di personale mancano all'appello migliaia di infermieri, medici e altro personale, registrando numeri ancora di svantaggio per la Campania: in Emilia Romagna e in Toscana ci sono 35 medici specialisti ogni 10.000 abitanti, in Campania come anche in Lombardia appena 31.



GLI ATTORI - Insomma sotto la lente la sfida della Sanità digitale, dell'innovazione biomedica e il valore delle risorse umane. Nel Comitato scientifico oltre a Iannotti, Enrico Coscioni presidente Agenas, Ugo Trama dirigente della Regione Campania e tra i componenti, tra gli altri, Valeria Fascione ed Ettore Cinque assessori regionali alla Ricerca e alle Attività produttive, Teresa Rea, presidente Opi Napoli Franco Ascolese, presidente Ordine di Napoli Av, Bn e Caserta delle professioni sanitarie tecniche della riabilitazione e prevenzione.



“Da 20 anni veniamo derubati di 300

Grave denuncia del presidente della Regione Vincenzo De Luca. Un danno per mancati trasferimenti dallo Stato che oscilla tra i 5 e i 7 mld. Il gap sanitario, il gap della Campania nei confronti delle regioni cosiddette benchmark. Infermieri, medici e Oss sotto organico per 15mila unità

di **DARIO DE MARTINO**



«**L**a Regione Campania viene derubata di 300 milioni di euro all'anno. In vent'anni abbiamo perduto fra 5 e 7 miliardi di euro. Non è una cifra banale». Entra subito nel vivo della questione il Governatore De Luca dal palco di Città della Scienza per chiudere una giornata dedicata alla sanità campana. Dopo i plausi per alcune eccellenze (prima regione d'Italia per tempi di pagamento) segnalate da Agenas (altre eccellenze in un altro pezzo, ndr) De Luca accende i riflettori sui nodi ancora irrisolti che impediscono al sistema salute regionale di essere a pieno quell'eccellenza nazionale cui aspira. Ma soprattutto sulle disuguaglianze di strutture, fondi, personale tra regioni che impediscono alla Campania di essere prima in tanti altri settori.

PENALIZZATI SUI TRASFERIMENTI - «Oggi abbiamo aperto la strada per avere un recupero almeno parziale delle risorse del Fondo Sanitario Nazionale, quindi dobbiamo recuperare risorse per arrivare per lo meno alla media nazionale sul personale, perché siamo ancora sotto di 15.000 dipendenti, e sulle strutture territoriali. Ora - attacca il presidente della Regione - siamo pienamente impegnati in questa sfida. Allo stato dei fatti ogni cittadino campano riceve un minor finanziamento di 57,00 euro rispetto ad altri italiani che vivono in altre regioni. La classifica delle disuguaglianze per regioni vede - con questi vecchi criteri - Liguria +76 euro, Friuli +45 euro, Umbria +40 euro, Piemonte + 36 euro e agli ultimi posti Campania -57 euro, Sicilia - 29 euro, Calabria - 19 euro, Puglia -16 euro. «La Campania, stando all'età media dei suoi abitanti, è la Regione più giovane d'Italia. E per questo viene puntualmente penalizzata nella ripar-

tazione del fondo sanitario nazionale, ricevendone una delle parti più esigue».

CRITERI SBAGLIATI - «Chi spartisce il denaro pubblico, quello del fondo sanitario nazionale - continua il governatore della Campania - non tiene conto di altri dati, ancor più rilevanti: la Campania è la Regione con il più alto tasso di **diabete infantile**. Ancora, non considera il dilagante disagio psicologico che affligge i nostri giovani, né i problemi di dipendenza e tossicodipendenza». Per il governatore della Campania «la quota del fondo sanitario nazionale spettante ad ogni singola Regione dovrebbe essere stabilita **in base al numero di abitanti**, prevedendo una quota pro-capite identica, a pre-



mln di euro”

governatore spiega così, a chiusura del Laboratorio
ità. Carenze di strutture territoriali e posti letto.



scindere dall'età anagrafica. E fin
quando questo cambiamento nelle mo-
dalità di ripartizione del fondo sanitario
nazionale non sarà reso operativo, «la
Campania – assicura il governatore –
continuerà ad essere “derubata” di 300
milioni di euro ogni anno».

MANCA IL PERSONALE - La carenza di personale è l'altro grande dramma con cui la Sanità campana deve fare i conti ogni giorno. «Com'è possibile – chiede De Luca – che nel corso degli anni non sia stata **programmata la formazione** di medici e infermieri in maniera perlomeno equivalente al numero dei pensionati? In Campania la situazione è drammatica soprattutto nei pronto soccorso – racconta il governatore -: non c'è il personale neanche per coprire i turni ordinari. Tanto che, non di rado, siamo costretti a chiudere i reparti di emergenza-urgenza degli ospedali più piccoli e periferici per assicurare la continuità assistenziale in quelli delle città più grandi e popolose. Spesso, per sopperire a queste carenze non ci resta che ricorrere a “misure di guerra”, utilizzando anche i giovani laureati specializzandi».

Posti letto, Campania fanalino di coda

Secondo l'edizione 2022 di Noi Italia dell'Istat, pubblicazione web che offre un quadro d'insieme dei diversi aspetti ambientali, economici e sociali dell'Italia, l'offerta ospedaliera continua a ridursi nel tempo con un conseguente risparmio di risorse economiche, ma anche con una sempre minore presenza del Servizio sanitario nazionale.

La spesa - In Italia, nel 2019, la spesa sanitaria pubblica è decisamente inferiore rispetto a quella di altri Paesi europei. A parità di potere di acquisto, a fronte di 3.653 dollari per abitante spesi in Italia nel 2019, Austria, Belgio, Danimarca, Francia, Irlanda, Lussemburgo e Olanda superano i 5.000 dollari, mentre la Germania, con i suoi 6.518 dollari per abitante, si conferma al primo posto per spesa pro capite.



Posti letto - Riguardo ai posti letto ospedalieri, l'Italia si colloca al ventiquattresimo posto della graduatoria dei Paesi Ue e continua a essere sotto la media europea (5,3 posti letto ogni mille abitanti). La tendenza verso un modello di rete ospedaliera sempre più integrato con l'assistenza territoriale ha determinato una diminuzione del numero di ospedali (da 1.378 nel 2002, a 1.045 nel 2019) e della dotazione di posti letto che, negli stessi anni, è passata da 4,4 ogni 1.000 abitanti a 3,1. I posti letto ospedalieri diminuiscono in tutte le Regioni italiane; Lazio, Toscana, Molise, Provincia Autonoma di Bolzano/Bozen e Calabria, registrano la riduzione maggiore. Nel 2019, si osserva un ampio divario tra le aree geografiche del Paese: il Sud presenta valori al di sotto della media nazionale (3,1 per 1.000 abitanti). In particolare Campania (2,5 posti letto per 1.000 abitanti) e Calabria (2,6) mentre il valore più alto si osserva in Emilia Romagna (3,7).

Attesa di vita - Si vive mediamente più a lungo al Centro-Nord. È la Campania ad avere il valore minimo di speranza di vita sia per le femmine (82,9 anni), sia per i maschi (78,3 anni). Nell'Ue, la speranza di vita è di 84,0 anni per le femmine, e 78,5 anni per i maschi (dati 2019). L'Italia è tra i Paesi europei con una speranza di vita alla nascita più elevata.



Al Laboratorio Sanità 20/30 la presidente dell'Ordine delle Professioni Infermieristiche di Napoli Teresa Rea ha portato l'esperienza attivata nel distretto 41 dell'Asl Napoli 2 Nord. "Un progetto importante - ha spiegato Teresa Rea - per migliorare le prestazioni sanitarie in funzione di pazienti ultrasessantenni e con patologie croniche, per estendere le prestazioni territoriali e di prossimità e nel contempo valorizzare il ruolo dell'infermiere sempre più proiettato ad una gestione manageriale dell'assistito, anche grazie alle potenzialità che il Pnrr offre in termini di potenziamento dell'assistenza territoriale e alle nuove tecnologie in termini di teleassistenza".

AFT - "Le Aft - ha precisato la Rea - sono forme organizzative mono-professionali di medici di medicina generale (Mmg) Assistenza primaria - e di Continuità assi-

L'infermiere di famiglia nelle Ag

La Presidente dell'Ordine delle professioni infermieristiche di Napoli Teresa Rea al Laboratorio Sanità 20/30

di ANNA



Cure primarie e un nuovo paradigma assistenziale

(A.a.) "Una riflessione a più voci, con l'importante contributo degli infermieri, su come migliorare nel complesso l'offerta sanitaria in Campania", Così **Antonio Postiglione**, coordinatore del Ssr della Campania, ha introdotto, da moderatore, il dibattito su l'infermiere di famiglia, assistenza territoriale e fondi Pnrr. Al tavolo, comoderato dal collega **Silvestro Giannantonio**, (responsabile comunicazione della Fnopi), Cristina Magnocavallo, componente comitato centrale Fnopi; Rossella Fasulo, vicepresidente Cup Campania; **Ciro Verdoliva**, dg dell'Asl Napoli 1, **Anna Iervolino**, dg Ospedale dei Colli, **Bruno Zuccarelli**, presidente Ordine dei medici di Napoli e rappresentanti degli Opi della Campania, Basilicata e Molise. **Cristina Magnocavallo** ha sottolineato come: "Il cambio di paradigma rispetto al quale dobbiamo guardare la sanità del futuro non è semplice da immaginare anche perché dovremo pensare a nuovi modelli di cure sanitarie dove ospedale e territorio interagiscono e dove gli infermieri svolgeranno un ruolo di cerniera, a cominciare da una figura che potrà essere decisiva in futuro: l'infermiere di cure primarie".

Un intervento che è stato particolarmente apprezzato dal dg Anna Iervolino: "Crescono a vista d'occhio gli over 65, La nostra è una sanità in cambiamento in contemporanea ad una società che si sta trasformando: le statistiche e gli studi demografici ci dicono che vi saranno 4 milioni e mezzo di over 65 in Italia nel 2030 e circa 1 milione e 200 mila persone saranno ultra 85enni. E con la scomparsa dei caregivers avremo bisogno di figure professionali altamente specializzate che prendano in ca-

rico i pazienti in modo manageriale, capaci di gestire in maniera integrata ospedale e territorio attraverso l'infermiere di cure primarie".

Per il direttore generale dell'Asl Na 1 **Ciro Verdoliva**, "il contributo che gli infermieri potranno dare al miglioramento della sanità regionale è e sarà decisivo. Non è un caso se abbiamo svolto i concorsi per 250 coordinatori infermieristici e per tutte le altre professioni sanitarie. In particolare, la nostra attenzione è rivolta ai coordinatori infermieristici attraverso un corso formativo manageriale semestrale che preveda delle fasi di laboratorio per poter guidare un'impalcatura così strutturata".

Per **Bruno Zuccarelli** è proprio il cambiamento sociale in atto che deve indicare la nuova rotta da prendere nell'assistenza sanitaria. "La migliore risorsa sulla quale investire resta la risorsa umana. Altrimenti potremmo avere tante Ferrari Testarossa, ma non avremo piloti per guidarle. E le case e gli ospedali di comunità saranno cattedrali nel deserto. Questa è la fotografia. È un bellissimo progetto teorico quello di cui si sta discutendo, ma la risorsa umana ha ancora valore? Curare è anche guardare negli occhi, ascoltare, comunicare. La cultura della razionalizzazione ha successivamente razionato e dai Livelli Essenziali di Assistenza siamo passati ai Livelli Eventuali Assistenziali. Bisogna saper leggere i nuovi bisogni della popolazione. Non si può più pensare a un livello assistenziale prestazionale. Le battaglie si fanno insieme per puntare sugli obiettivi comuni e la risorsa umana va difesa insieme".

Aggregazioni funzionali territoriali

0/30: "Estendere il Progetto degli infermieri nelle Aft e migliorare le attività di prevenzione e screening"

ARNONE



stenziale che perseguono gli obiettivi di salute e di attività definiti dall'azienda. Ultimamente però proprio nelle Aft s'è resa necessaria una riorganizzazione e una ristrutturazione dei servizi attraverso l'introduzione dell'infermiere di famiglia. Ciò per raggiungere e migliorare le attività di prevenzione e screening, arrivando al valore soglia del 10% della presa in carico dei pazienti sopra i 65 anni con patologie croniche". Una svolta importante per l'assistenza sul territorio perché consente un'efficace valorizzazione della figura dell'infermiere di famiglia, anche grazie all'implementazione dei sistemi di telemedicina (app di TeleNursing e Teleassistenza). Ma anche di perseguire importanti obiettivi: 1) incrementare il numero di pazienti presi in carico a domicilio come previsto dal Pnrr; 2) ridurre gli accessi impropri al pronto soccorso e le ospedalizzazioni; 3) implementare l'utilizzo dei servizi di telemedicina che risulteranno decisivi in un prossimo futuro per gestire un crescente numero di pazienti ultrasessantenni e con diverse morbidità croniche. "E' proprio quanto messo in campo nel distretto 41 dell'Asl Napoli 2 Nord – ha spiegato la presidente Opi Napoli – attraverso medici di medicina generale e infermieri. Dove si è sviluppato un modello organizzativo con

l'obiettivo di incrementare il numero di pazienti presi in carico a domicilio, raggiungendo il valore soglia del 10%.

INNOVAZIONE TECNOLOGICA

- Nell'ambito del progetto "Servizio Salute", realizzato dagli infermieri per gli infermieri, è stata recentemente sviluppata un'applicazione che permette l'agevolazione della comunicazione tra tutti i membri dell'équipe sanitaria, la riduzione della distanza con l'assistito e il miglioramento della qualità assistenziale. "Le attività ambulatoriali e di Tele-Assistenza – ha illustrato Teresa Rea – sono coordinate dalla Centrale Operativa composta da tecnici informatici, medici, infermieri specialistici, coordinatori, case o care manager attraverso un percorso attivabile sia a livello territoriale, che ospedaliero, per migliorare l'aderenza al piano terapeutico e garantire 7 giorni su 7 la prevenzione, l'educazione, il consulto e la visita per avere sempre come centro di tutto il cittadino.

POSTI DI LAVORO - Il progetto è finanziato dall'Accordo Collettivo Nazionale della Medicina Generale del 2018 e integrato con l'AIR Campania 2020 con un incremento del fondo dell'8% annuo.

Tali fondi garantiscono, per ogni Aggregazione Funzionale Territoriale formata da almeno 20 medici di medicina generale, la copertura di 4 infermieri divisi in 12 ore al giorno per 7 giorni e l'utilizzo della piattaforma di Tele-Assistenza".

IL FUTURO - In futuro si potrebbe prevedere di estendere il progetto del distretto 41 dell'Asl Napoli 2 Nord su altri territori. Magari coinvolgendo la rete formativa universitaria. "In questi anni - ha osservato la Rea - le Università si sono preoccupate finora di formare professionisti solo in funzione dell'attività svolta in ospedale. In queste nuove realtà, gli studenti dei corsi di laurea in infermieristica potrebbero essere affiancati da tutor competenti e specializzati. Potrebbe essere un'opportunità per tutti per incanalare infermieri già con un proprio bagaglio esperienziale nell'ambito clinico e sfruttare l'abbattimento del vincolo di esclusività. Insieme si può lavorare e stabilire la modalità per favorire questo tipo di organizzazione per dare accesso alle cure, stare accanto al cittadino, anche attraverso le nuove applicazioni tecnologiche. Tutto questo favorirà sempre più l'autonomia di una professione che è stata per anni ancillare di quella medica e che è, invece, ha già nelle sue origini una natura intellettuale, amplierà la Tele-Assistenza, intercetterà i pazienti fragili, garantirà l'equità di accesso alle cure e saprà rendere il domicilio un luogo di cura. Proprio come prevede il Pnrr".



Politica sanitaria

«**A** desso dobbiamo vincere la battaglia per le liste d'attesa. Qui ci sono ancora tempi troppo lunghi ed è uno dei motivi per cui abbiamo tanti cittadini che si fanno curare fuori regione. E questo non va bene. Anche perché non possiamo consentirci di pagare centinaia di milioni di euro alla realtà del nord. Da questo punto di vista saremo spietati nei prossimi mesi. La Regione ha deciso di investire 22 milioni di euro per recuperare sulle liste d'attesa». Così il presidente della Campania, Vincenzo De Luca è intervenuto su uno dei fronti difficili della sanità regionale.

TETTI DI SPESA - «Devo dire - aggiunge il governatore - che ci sono anche cose che vanno chiarite all'opinione pubblica: ogni tanto mi capita di guardare delle immagini di file di cittadini davanti ai laboratori privati accreditati, e qualcuno confonde le idee. «I tetti di spesa per i laboratori privati sono fissati dallo Stato italiano e sono fermi al 2011. Quindi, intanto bisogna fare una battaglia contro il governo perché siano aumentati i tetti di spesa per la sanità campana, poi bisogna evitare furbate, perché ci sono anche delle anomalie che vanno corrette. C'è gente che fa prescrizione così a ruota libera senza alcuna appropriatezza».

IL METODO - Ma in ogni caso - prosegue ancora - il problema delle liste di attesa sarà un problema che risolveremo entro il 2023. Già abbiamo stabilito un metodo per le prenotazioni che si possono fare in tutte le farmacie della Campania e avere l'indicazione della struttura sanitaria pubblica e privata dove fare le prestazioni che vengono richieste nel tempo più rapido possibile: massimo rispetto e disponibilità, massima apertura ma l'obiettivo di abbattere le liste di attesa è vincolante per tutti, altrimenti andiamo avanti a carro armato».

I FONDI - «I 22 milioni di euro di fondi del bilancio regionale di residui per l'abbattimento delle liste d'attesa sono ulteriori fondi - precisa il Governatore - che servono per dare incentivi alle Asl per l'abbattimento delle liste di attesa e servono anche per integrare i tetti di spesa cioè le risorse per sovvenzionare le strutture private convenzionate». In realtà, si tratta di risorse finanziarie (90 mln) che la Regione Campania ha già ricevuto nel 2022 da Mef e Ministero della Salute per il recupero delle liste d'attesa allungatesi a dismisura a causa del covid e che Palazzo Santa Lucia si è impegnata a spendere entro quest'anno.

IN RITARDO - La Campania figura tra le Regioni in forte ritardo sul recupero delle liste d'attesa. Ha infatti utilizzato «meno del 50 per cento del finanziamento e recuperato meno del 50 per cento delle prestazioni» sostiene nel corso di un'interrogazione parlamentare Marcello Gemmato. «Con il Programma Operativo 2022-24 - spiega il sottosegretario alla Salute - la Regione si è

Liste d'attesa, 22 mln per

La Regione Campania stanZIA i fondi previsti dal piano nazionale per il recupero delle prestazioni non a disposizione avendo fin qui utilizzato meno del 50 per cento del finanziamento e recuperato me

di PINO DE



Gimbe: “Per le attività sanitarie pos

In Campania, per l'anno 2022, la percentuale di recupero delle prestazioni sanitarie è pari al 10% (dato Italia 65%). Dato che la pone agli ultimi posti della speciale classifica stilata dalla Fondazione Gimbe. “Delle 20,3 milioni di prestazioni arretrate, nel 2022 - dice il report - complessivamente ne sono state recuperate poco meno di due su tre, ovvero il 65% e nessuna Regione ha raggiunto per tutte le prestazioni le quote di recupero previste dai POR”. Inoltre, i risultati evidenziano un'ampia variabilità nei livelli di performance sia tra le varie Regioni, sia all'interno della stessa Regione tra differenti tipologie di prestazioni. Ma si va dal 99% della Toscana al 10% della Calabria. Gimbe: “Mancano oltre 7 milioni di prestazioni”.

Dopo i poco lusinghieri dati consegnati dal rapporto “Crea sanità”, con la Campania bocciata alla prova delle Performance 2023 su appropriatezza, equità, sociale, esiti, economico-finanziaria, innovazione, disegnato dalla XI edizione del rapporto arriva l'ennesima fotografia in negativo del sistema sanitario regionale campano. Scendendo nel dettaglio del rapporto Gimbe scopriamo che in Campania il recupero dei ricoveri chirurgici programmati è pari al 22% (dato Italia 66%); la percentuale di recupero degli inviti a screening oncologici è pari al 21% (dato Italia 82%); prestazioni di screening oncologico al 16% (Italia 67%); prestazioni ambulatoriali è pari al 7% (Italia 57%). Ed ancora la percentuale del finanziamento rendicontato rispetto a quello assegnato è pari al 35% (dato Italia 69%), mentre quella di committenza alle strutture private accreditate è pari al 37% (Italia 29%). Numeri incontrovertibili.



Politica sanitaria

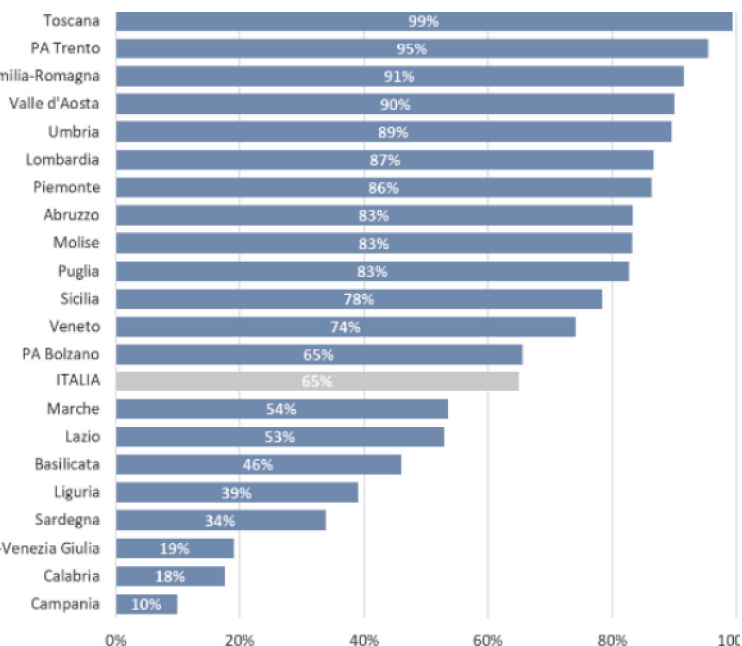
recuperare il terreno perso

on erogate durante il covid. Palazzo Santa Lucia si è impegnato a spendere entro quest'anno i fondi
eno del 50 per cento delle prestazioni. De Luca: "Entro il 2023 dobbiamo vincere questa battaglia"

E MARTINO



Il covid Campania all'ultimo posto



impegnata "ad una puntuale attività di ricognizione volta a rilevare la concreta capacità operativa delle aziende di procedere entro il termine del 31 dicembre 2023 al recupero delle liste di attesa sulla base di quanto previsto dagli specifici provvedimenti regionali (da ultima DGRC 209/2022) e conseguentemente stimare per l'esercizio

2023 gli utilizzi delle somme assegnate negli esercizi 2021, 2022 e non ancora impiegate al 31 dicembre 2022». Per il 2023 è previsto l'utilizzo delle somme assegnate nel 2021 e 2022 e non impiegate al 31 dicembre 2022, cui si aggiungono le economie del budget assegnato nel 2020 per altri 15 milioni di euro circa. Si tratta di fondi da utilizzare, entro il 31 dicembre 2023 esclusivamente per il recupero delle liste di attesa.

SUL CAMPO - Sul piano operativo si riprendono per tutto il 2023 le visite, prestazioni, ricoveri e indagini da effettuare in extra-ordinario, di pomeriggio o nei fine settimana, remunerando i team sanitari con i fondi disponibili o oltre i limiti dei tetti di spesa per gli accreditati. La Regione fornisce indirizzi alle aziende di utilizzare i fondi che non sono riuscite a spendere nel 2021 e nel 2022. Recupera anche altre economie che sono destinate a integrare i budget dei privati accreditati sia per l'assistenza ospedaliera e per quella specialistica ambulatoriale, in aggiunta ad altri fondi destinati allo scopo in virtù di deroghe alla spending review.

SERVIZIO PUBBLICO - Le aziende pubbliche, invece, avviano da subito i propri piani operativi basati su incremento delle prestazioni aggiuntive, prolungamento degli orari, aperture nei weekend e altre soluzioni in base alle necessità e specificità di ciascuna azienda. Fondamentale sarà l'allineamento dei tempi di attesa e dei volumi delle prestazioni ambulatoriali e di ricovero erogate in regime istituzionale rispetto ai tempi di attesa e dei volumi delle stesse prestazioni rese in regime di libera professione intramuraria (intramoenia) con l'obbligo di tirare il freno a queste ultime (già scattato nelle settimane scorse) se esuberano dall'attività ordinaria gratuita per i cittadini. La Regione Campania corre ai ripari e vara un piano straordinario per sfoltire le code e accelerare l'accesso a ricoveri e prestazioni ambulatoriali di migliaia di cittadini costretti ad attendere mesi e fino a un anno per ricevere le cure perse durante il Covid e prenotate negli ultimi due anni. Obiettivo del programma, varato con delibera di Giunta, è dunque recuperare il terreno perso negli ultimi due anni soprattutto a causa delle carenze di personale scoperte nella fase di uscita dall'emergenza Covid e dopo i tagli imposti dai 10 precedenti anni di commissariamento.



Politica sanitaria

“Dove le prestazioni sono peggiori è maggiore la carenza d’infermieri”

Dal Rapporto del Crea Sanità emerge la stretta correlazione tra le performance sanitarie regionali insufficienti e carenza di personale infermieristico. Il tradizionale modello organizzativo è ormai inefficace per rispondere alle esigenze di salute della popolazione. Mangiacavalli: “Il nuovo paradigma sanitario si fonda sulla costruzione di reti di prossimità territoriale”. Rea (Opi Napoli) “Riconoscere la formazione accademica post base specialistica, incrementare i docenti universitari infermieri di ruolo, garantire l’evoluzione di conoscenze e competenze manageriali per i ruoli di direzione con percorsi distinti e successivi alla laurea magistrale”.

di PINO DE MARTINO

Analizzando voce per voce l’analisi sviluppata dall’ultimo Rapporto Crea Sanità sulle performance regionali 2023 (in un articolo a lato, ndr), secondo cui la Campania figura tra le regioni bocciate in *appropriatezza, equità, sociale, esiti, economico-finanziaria e innovazione*, la conseguenza è logica: “servono più infermieri”, ma anche più territorio e nuovi modelli organizzativi.

E’ la considerazione cui perviene la Fnopi (la federazione degli ordini delle professioni infermieristiche) che rappresenta i 460.000 infermieri presenti in Italia.

Poco personale - Secondo gli infermieri, il nodo più grande che è necessario sciogliere per riportare equità nell’offerta sanitaria in tutto il paese è sicuramente la carenza di personale. Gli infermieri sono un cardine essenziale dell’assistenza sul territorio, per il recupero e il monitoraggio dell’appropriatezza e, con essa, dell’equità del sistema e rappresentano l’anello di congiunzione tra professioni sanitarie e sociali. Ma gli infermieri sono anche i professionisti più carenti nella sanità italiana con circa 65-70.000 unità in meno. E dai risultati del rapporto Crea emerge un dato che lo conferma: quasi tutte le Regioni con le performance peggiori sono anche quelle dove la carenza di infermieri è maggiore: la carenza è bassa o assente ad esempio in Veneto, a Bolzano e Trento, che hanno



ottenuto il migliore risultato nell’analisi Crea Sanità, mentre è altissima (non meno di 5.000 e anche sopra le 10.000 unità) in Calabria, Campania, Puglia, Sicilia e in generale in tutte le Regioni con le performance peggiori.

Quali soluzioni - Servono soluzioni immediate e strutturali, dicono gli infermieri. Non più pannicelli caldi utili a tamponare le emergenze. “Il tradizionale modello organizzativo è ormai inefficace per rispondere alle esigenze di salute della popolazione come dimostra anche l’analisi Crea Sanità – spiega Barbara Mangiacavalli, presidente Fnopi -. Il

nuovo paradigma sanitario si fonda sulla costruzione di reti di prossimità territoriale, determinando uno spostamento dei setting assistenziali, dai luoghi tradizionali di cura, come gli ospedali, verso strutture territoriali che possano favorire l’integrazione sociosanitaria e la continuità dei percorsi. Questo è quanto richiede l’evoluzione della professione infermieristica, dei relativi profili di competenza e dei ruoli agiti nelle diverse strutture sanitarie e dei percorsi formativi, che possano accompagnare e stimolare il cambiamento”.

L'Italia si fa in tre. Tra Regioni promosse, rimandate e quelle bocciate

Il rapporto ha scattato una fotografia di un'Italia divisa tre, con Regioni tutte del Centro-Nord in cui l'assistenza sicuramente è migliore e Regioni - tra cui tutte quelle del Sud -, che invece sono assolutamente penalizzate e indietro per poter garantire appropriatezza, equità, sociale, innovazione, esiti, e dimensione economico-finanziaria della sanità.

I voti - Cinque Regioni "promosse" (Piemonte, Lombardia, Emilia Romagna, Toscana e Marche) di cui tre con lode (Veneto, Trento e Bolzano). Sette "rimandate" (Liguria, Friuli-Venezia Giulia, Lazio, Umbria, Molise, Valle d'Aosta e Abruzzo) e sei "bocciate" (Sicilia, Puglia, Sardegna, Campania, Basilicata e Calabria). Questo il quadro delle Regioni italiane alla prova delle Performance 2023 sui temi appropriatezza e equità delle cure, sull'impatto sociale, e sugli esiti post ricovero disegnato dall'ultima edizione del rapporto **"Le Performance Regionali"** del Crea Sanità, Centro per la Ricerca Economica Applicata in Sanità. Una fotografia dalla quale emerge con prepotenza un'Italia divisa in tre parti, con circa 29 milioni di cittadini nelle prime otto Regioni sul podio che possono stare relativamente tranquilli e altri 29 milioni nelle Regioni rimanenti che potrebbero avere serie difficoltà. Un quadro, evidenzia il Crea, che sottolinea la nuova impostazione di ammodernamento dell'assistenza che punta sul territorio e sulla domiciliarità, come prescritto dal Pnnr e dal Decreto 77/2022 di riordino dell'assistenza territoriale.

I "voti" alle Regioni sono state assegnati quest'anno da oltre 100 esperti raggruppati in un Panel multistakeholder diviso in cinque grandi gruppi: istituzioni, management aziendale, professioni sanitarie, utenti, industria medica, che hanno anche ideato un sistema di monitoraggio 'dinamico' degli effetti dell'autonomia differenziata. Un sistema che da oggi è oggetto di valutazione da parte del CREA e dei suoi esperti: oltre ai rappresentanti del Panel, il CREA si avvale di docenti universitari nei campi dell'economia, del diritto, dell'epidemiologia, dell'ingegneria biomedica, della statistica medica.

Le Performance Regionali Sono sei le dimensioni analizzate (appropriatezza, equità, sociale, esiti, economico-finanziaria, innovazione) e le performance sono state indicate dal Crea Regione per Regione nel modo più semplice: i valori degli indicatori sono stati associati a due colori differenti: verde se il valore è migliore della media nazionale e rosso se è peggiore. Così, ad esempio, il Veneto (Regione che ha ottenuto i risultati migliori) presenta tutti gli indicatori delle prime quattro dimensioni per importanza "verdi". E solo nella dimensione economico-finanziaria ha due 'rossi' per quanto riguarda la spesa sanitaria pubblica e l'incidenza dei consumi sanitari sul totale dei consumi; e nella dimensione innovazione non va l'attuazione del fascicolo sanitario elettronico. La Calabria (la Regione coi risultati peggiori) è quasi tutta "rossa"; su diciotto indicatori, in verde ha solo quelli sull'ospedalizzazione evitabile per malattie croniche (unico nelle dimensioni maggiori), l'indice di salute mentale, la spesa pro-capite standardizzata, l'implementazione della rete oncologica e lo sviluppo del fascicolo sanitario elettronico.

Entrando nello specifico delle "pagelle", come abbiamo visto, Veneto,

Trento e Bolzano hanno ottenuto il miglior risultato 2023 (con punteggi che superano la soglia del 50% del risultato massimo ottenibile, rispettivamente: 59%, 55% e 52%).

Toscana, Piemonte, Emilia-Romagna, Lombardia e Marche vanno abbastanza bene, con livelli dell'indice di Performance compresi tra il 47% e il 49 %.

Ma le buone notizie finiscono appunto qui: se Liguria, Friuli-Venezia Giulia, Lazio, Umbria, Molise, Valle d'Aosta e Abruzzo raggiungono livelli di Performance abbastanza omogenei, seppure inferiori, compresi nel range 37-43%, Sicilia, Puglia, Sardegna, Campania, Basilicata e Calabria, hanno livelli di Performance che risultano inferiori al 32%.

La valutazione 2023 delle Performance regionali, in tema di tutela socio-sanitaria offerta ai propri cittadini residenti, oscilla da un massimo del 59% (fatto 100% il risultato massimo raggiungibile) ad un minimo del 30%: il risultato migliore lo ottiene il Veneto ed il peggiore la Calabria.

Gimbe - Dopo 10 anni di battaglie di Gimbe per la sanità pubblica, i dati e la cronaca dimostrano che il collasso del Ssn ci sta portando dritti verso un disastro sanitario, economico e sociale». Lo afferma Nino Cartabellotta, presidente della Fondazione Gimbe intervenuto alla manifestazione nazionale in difesa del diritto alla salute e per il rilancio del servizio sanitario a Roma. Nel 2013 Gimbe ha lanciato la campagna «Salviamo il Nostro Servizio Sanitario Nazionale» (www.salviamo-ssn.it) per sensibilizzare decisori politici, manager, professionisti sanitari e tutti voi - che siete i veri azionisti di maggioranza del Ssn - sulla necessità di rimettere la sanità pubblica al centro del dibattito pubblico e dell'agenda politica. «Il Piano di rilancio del Ssn - sottolinea Cartabellotta - indica tutte le azioni da mettere in campo: rilanciare progressivamente il finanziamento pubblico per allinearli entro il 2030 almeno alla media dei paesi europei; potenziare le capacità di indirizzo e verifica dello Stato sulle Regioni; garantire l'aggiornamento continuo dei Lea per rendere subito accessibili le innovazioni; rilanciare le politiche sul personale sanitario; riprogrammare l'offerta dei servizi socio-sanitari in relazione ai reali bisogni di salute della popolazione; regolamentare rapporto pubblico-privato e sanità integrativa; investire in prevenzione e promozione della salute; potenziare l'informazione istituzionale basata sulle evidenze scientifiche; aumentare le risorse per la ricerca indipendente; rimodulare ticket e detrazioni fiscali per le spese sanitarie». «Il Pnnr rappresenta un'opportunità per rilanciare il Ssn, ma solo se inserito in un quadro di rafforzamento complessivo della sanità pubblica - prosegue - In caso contrario rischiamo di indebitare le future generazioni per finanziare solo un costoso sollevamento del Ssn. Il Pnnr non può rappresentare solo la stampella di un SSN in agonia».



**Il presidente De Luca
a casa degli infermieri**

“Dateci una mano sugli screening”

Il governatore della Campania in visita all'Ordine delle professioni infermieristiche di Napoli. Rispondendo alle richieste

“Un progetto obiettivo per dare agli infermieri maggiore gratificazione professionale e una delibera che autorizza

di ANNA

“Grazie per il lavoro che fate tutti i giorni vicini agli ammalati. Siete stati importantissimi negli anni del Covid. Ora, cari infermieri, abbiamo bisogno d'aiuto. “Ci dovete dare una mano sulle liste d'attesa e sugli screening”. Così il presidente della Regione Campania Vincenzo De Luca ha esordito nel suo intervento tenuto nel corso della visita annunciata nella casa degli infermieri. Un sos agli infermieri che è sembrato una prima risposta alle richieste che la Presidente Rea aveva avanzato nel corso del faccia a faccia tenuto a giugno per chiedere più infermieri in corsia e sul territorio e maggiore valorizzazione della professione. Poi tanti elogi e tanti riconoscimenti, ma anche precisi impegni sulla valorizzazione della professione e sulla possibilità di immettere tanti nuovi infermieri negli ospedali e soprattutto sul territorio attraverso lo scorrimento continuo delle graduatorie.

A casa sua - Puntuale come un orologio svizzero, il governatore è stato accolto dalla presidente Teresa Rea e da buona parte del gruppo dirigente dell'Opi Napoli. Con fare familiare, di chi si sente



(a.a.) - *“Facciamo tanta formazione e miglioriamo ogni giorno le nostre competenze. Ma abbiamo bisogno di un cambiamento radicale della sanità in termini di organizzazione dei servizi per fornire quelle risposte alla domanda di salute che proviene dai cittadini e che solo gli infermieri possono offrire. Ma soprattutto abbiamo bisogno di una maggiore considerazione delle istituzioni sanitarie e non, anche per ridare quell'attrattiva che in questi anni di Covid, di aggressioni e bassi salari la professione d'infermiere ha perso. Con la visita del presidente De Luca nella casa degli infermieri sentiamo che questa nostra unità, professionalità e esclusività assistenziale sia apprezzata nella maniera giusta e sia riconosciuta”.*

Così la presidente Teresa Rea ha risposto alle domande dei giornalisti a margine della visita del governatore De Luca nella casa degli infermieri di Napoli.

Presidente Rea, molti apprezzamenti da parte del governatore e anche qualche progetto interessante.

“Accolto il nostro appello, più valor

“Si ho avvertito anch'io questa disponibilità e lo ringrazio ancora per le belle parole nei confronti della professione infermieristica. Una sensibilità che ho imparato a riconoscere e della quale gli sono grata, ma che credo nasca anche dalla serietà dei nostri comportamenti e del nostro lavoro quotidiano fatto di turni stressanti, aggressioni e sacrifici fatti in silenzio e che oggi ci sono riconosciuti.”

Nel merito dei progetti?

“Decisamente interessante quanto previsto dal progetto obiettivo sulle liste d'attesa e sugli screening, anche perché De Luca ha detto chiaramente che questo progetto di collaborazione serve a dare una mano alla sanità regionale e a migliorare le prestazioni sanitarie, ma anche a valorizzare adeguatamente e nel merito anche economico il lavoro e la professio-

nalità degli infermieri. Del resto, tra le nostre attività vi sono quelle rivolte alla formazione itinerante: usciamo dalle porte del nostro ordine per andare nelle aziende ospedaliere e nelle Asl per formare i nuovi infermieri presenti su tutto il territorio, affinché portino sempre più innovazione. Un lavoro importante di crescita professionale, tuttavia, che rischia di passare in secondo piano a causa delle condizioni di lavoro ai limiti del sostenibile, dei carichi di lavoro eccessivi e dei pochi infermieri in servizio”.

Ma anche su questo De Luca ha dato assicurazioni promettendo un ulteriore scioglimento delle graduatorie.

“Sì. Una manna dal cielo se fosse accolta. Del resto durante l'ultimo incontro alla Regione avevo espresso serie preoccupazioni per la forte carenza di personale infermieristico,

**Il presidente De Luca
a casa degli infermieri**



g e per abbattere le liste d'attesa"

este di maggiore attenzione verso la professione avanzate dalla presidente Teresa Rea, annuncia due provvedimenti:
zi le aziende sanitarie ad andare oltre la soglia prevista dalla legge, utilizzando lo scivolamento delle graduatorie"

ARNONE



felicemente ospitato, si è mostrato disponibile alle foto e alle interviste, cosa insolita ci ha spiegato Luigi l'addetto al cerimoniale. Ha visitato la sede di piazza Carità, ha salutato con familiarità la platea, e dopo il saluto istituzionale rivoltagli dalla presidente Teresa Rea (in un altro articolo qui di fianco) ha preso la parola.

Liste d'attesa - "Nei prossimi giorni - ha annunciato il Governatore - metteremo appunto un progetto obiettivo con voi infermieri perché ci dovete dare una mano ad abbattere le liste d'attesa e a potenziare l'attività di screening, soprattutto oncologici, per allargare la prevenzione sul territorio, nei quartieri". Il progetto per il quale il governatore della Campania ha chiesto aiuto agli infermieri intende potenziare screening, soprattutto oncologici, e ridurre le liste d'attesa. Una collaborazione che nasce dall'esigenza di dover dare piena attuazione al programma per l'abbattimento delle liste d'attesa per il quale la Regione Campania ha già ricevuto nel 2022 da Mef e Ministero della Salute i fondi necessari per il recupero delle liste d'attesa allungatesi a dismisura a causa del covid e che

Palazzo Santa Lucia si è impegnata a spendere entro quest'anno. La Campania figura tra le Regioni in forte ritardo sul recupero delle liste d'attesa. Ha infatti utilizzato fin qui meno del 50 per cento del finanziamento e recuperato meno del 50 per cento delle prestazioni.

Più infermieri - Nel merito delle nuove assunzioni chieste dalla presidente Rea nell'ultimo incontro, De Luca ha detto: "Nei prossimi giorni predisporremo una delibera che autorizzi le aziende sanitarie ad andare oltre la soglia prevista dalla legge, utilizzando lo scivolamento delle graduatorie, per dare risposte ai cittadini nel più breve tempo possibile. Ma anche un progetto di lavoro comune tra Regione Campania e Ordine degli infermieri per una collaborazione nell'interesse di tutti, della sanità pubblica che in Campania non sarà mai divisa tra ricchi e poveri, e dei professionisti. Con l'impegno di far rispettare rigorosamente il lavoro infermieristico per creare una macchina perfetta che dia agli infermieri gratificazione e un reddito più elevato, perché il lavoro e il sacrificio vanno premiati".

e alla professione"

sia negli ospedali, sia sul territorio. Ma soprattutto il rischio che la mancanza di diecimila infermieri in Campania possa inficiare fortemente il progetto sulla sanità territoriale, ma soprattutto sulla qualità dell'assistenza. Perché non dobbiamo dimenticare che dove le prestazioni sanitarie sono peggiori è maggiore la carenza d'infermieri".

Altro tema affrontato è stato quello dei nuovi bisogni di salute da parte del cittadino.

"La nostra popolazione sta cambiando: gli anziani sono sempre più fragili e soli; la nostra vicinanza e le nostre competenze possono essere messe a loro disposizione perché più assistenza infermieristica significa più salute. Se gli infermieri entrano nelle scuole e nelle famiglie si ha la possibilità di portare le nostre competenze e per offrire le giuste risposte ai nuovi bisogni di salute".



OpiNapoli informa

Triage, lotta contro il tempo: l'esperienza del Cardarelli

L'infermiera Aurora Menna con le telecamere di Nurse24 per uno short video sul pronto soccorso

di SARA DI SANTO

Tra voglia di scappare e voglia di continuare ad essere travolti dall'uragano che esso rappresenta, il Pronto soccorso lo ami oppure lo odi. E può anche capitare che l'amore, a lungo andare, ti logori: «Dà molta adrenalina, è un lavoro a cui ci si appassiona - spiega Aurora Menna, infermiera esperta di Triage al Cardarelli di Napoli -, ma l'adrenalina a lungo andare fa anche male». Le telecamere di Nurse24.it sono entrate nelle sale (da poco rinnovate) destinate ad accoglienza, triage e pre-triage per documentare la complessità del lavoro dell'infermiere in quello che è uno dei Pronto soccorso simbolo dell'intero paese.

Triage infermieristico, una funzione che va sempre sostenuta.

Sovraffollamento, incapacità dei reparti di assorbire nuovi pazienti (che quindi rimangono nell'area emergenza), medicina del territorio in affanno con

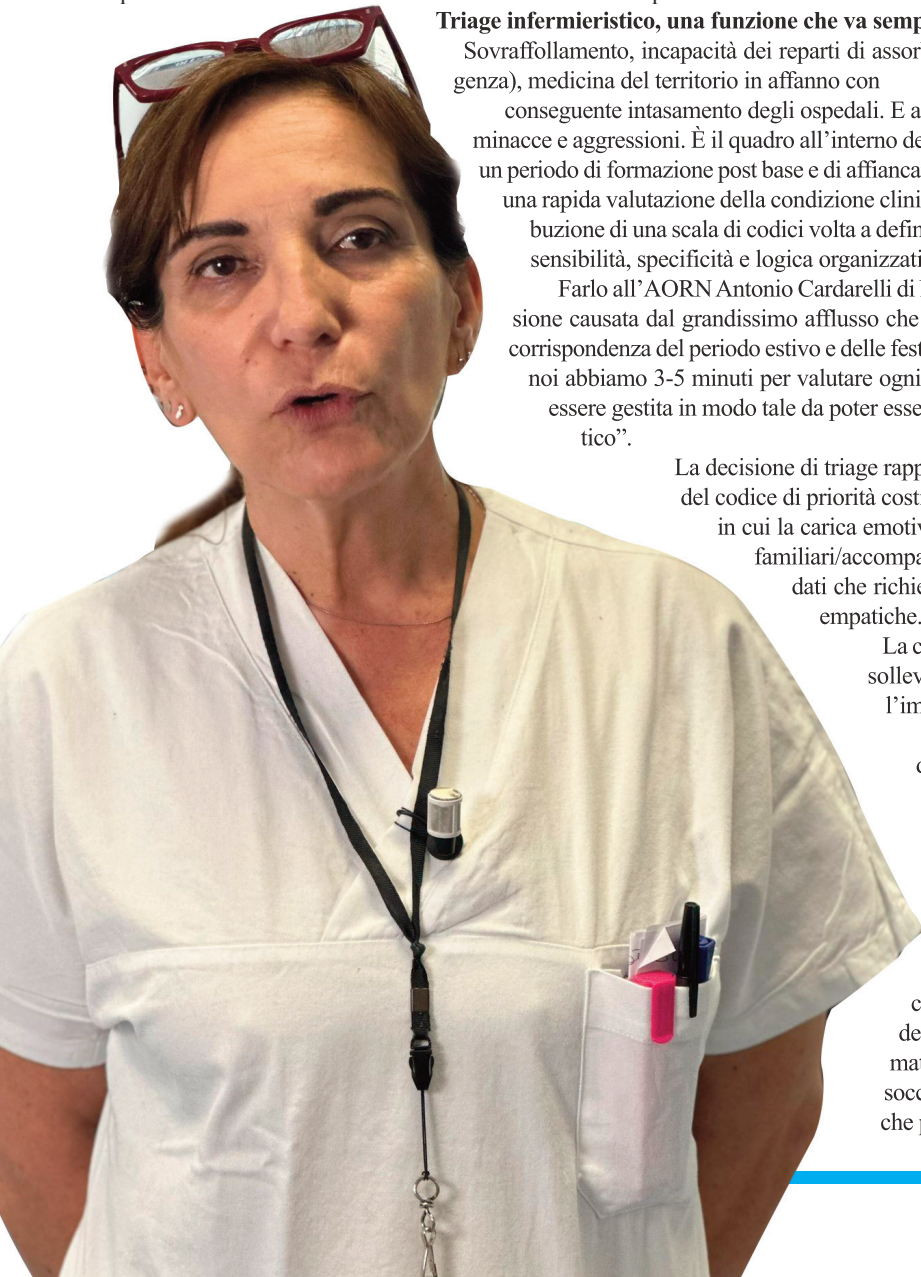
conseguente intasamento degli ospedali. E ancora: accessi impropri, carenza di personale, escalation di minacce e aggressioni. È il quadro all'interno del quale operano gli infermieri di Pronto soccorso che, dopo un periodo di formazione post base e di affiancamento ad hoc, si occupano anche della fase di triage, ovvero una rapida valutazione della condizione clinica dei pazienti e del loro rischio evolutivo attraverso l'attribuzione di una scala di codici volta a definire la priorità di trattamento. Processo che richiede rapidità, sensibilità, specificità e logica organizzativa.

Farlo all'AORN Antonio Cardarelli di Napoli significa farlo in una realtà sulla quale grava la pressione causata dal grandissimo afflusso che si registra nell'arco di tutto l'anno, con picchi notevoli in corrispondenza del periodo estivo e delle festività. **“Il nostro nemico è il tempo.** Da protocolli universali noi abbiamo 3-5 minuti per valutare ogni paziente. Il tempo è quindi una risorsa preziosa, che deve essere gestita in modo tale da poter essere riservata soprattutto ai pazienti con uno stato clinico critico”.

La decisione di triage rappresenta un processo molto complesso, in cui l'attribuzione del codice di priorità costituisce solamente il primo passaggio. Il tutto in un contesto in cui la carica emotiva di apprensione e preoccupazione del paziente e dei suoi familiari/accompagnatori si aggiunge alla messa in pratica di protocolli validati che richiede un notevole substrato di competenze, specialistiche ed empatiche.

La comunicazione – E' una componente importantissima: basta sollevare un sopracciglio per scatenare un'aggressione. Da qui l'importanza delle

modalità con le quali l'infermiere si pone nei confronti del paziente, sapere come agganciare anche dal punto di vista empatico la persona nei pochi minuti a disposizione. Oggi il Pronto soccorso del Cardarelli vanta un'area completamente rinnovata che comprende le sale destinate al triage, pre-triage ed un'ampia zona d'attesa dedicata ai pazienti di minore gravità. E ancora: un nuovo percorso di accesso per pazienti e accompagnatori, ideato per garantire una migliore accoglienza e una più veloce ed efficiente gestione degli ingressi. Al via anche l'introduzione della figura dell'infermiere di processo - specificamente formato per la “presa in carico” del paziente in transito al Pronto soccorso – e i fast track, percorsi di gestione veloce per specifiche patologie d'interesse ortopedico o ginecologico.



Infermiere penitenziario: identità professionale, formazione e carriera

a cura di SANDRO LIBIANCHI (1), GIUSEPPE MARCUCCI (2), ADA SILVESTRI (3), MAURIZIO MUSOLINO (4)

La professione dell'infermiere, come tutte quelle sanitarie, è particolarmente soggetta ai processi di apprendimento e formazione della specifica area, non disgiunti da una pressante necessità d'integrazione interprofessionale nella visione di un esercizio professionale congiunto con i medici, gli psicologi e gli assistenti sociali. Questo è il caso peculiare della sanità in carcere che deve essere riconosciuta come una vera e propria specializzazione. Lungo questa direttrice si muove l'accordo che a breve sarà sottoscritto con l'Ordine delle Professioni Infermieristiche di Napoli per l'organizzazione di eventi formativi permanenti in tema di sanità penitenziaria. Ciò perché anche gli ordini professionali giocano un ruolo primario nella formazione e nell'informazione professionale.

Va ricordato che con il DPCM del 1° aprile 2008 e con i numerosi accordi e intese in Conferenza Unificata le regioni e le Asl hanno ricevuto la responsabilità della gestione della salute delle persone in stato di carcerazione e quindi ristrette nelle strutture penitenziarie italiane.

Questa nuova realtà ha mutato profondamente sia l'assetto organizzativo delle prestazioni sanitarie in carcere dall'assenza di un precedente modello, all'esigenza di uniformare

queste prestazioni alla medicina territoriale in cui il carcere è entrato a far parte. La portata di questo evento normativo è qualitativamente paragonabile all'istituzione del servizio sanitario nazionale del 1978, che esclude le carceri dalla sanità generale relegandole ad una gestione quasi esclusiva a carico del Ministero della Giustizia. Con il DPCM si è completato l'iter di equiparazione del diritto sanitario tra tutti i cittadini italiani, indipendentemente dal loro stato giuridico. Una modifica dell'organizzazione sanitaria del territorio di questa portata e delicatezza avrebbe dovuto prevedere un'importante opera di formazione e riorganizzazione della medicina e delle scienze infermieristiche e della psicologia, adeguate alla specificità della nuova situazione. Purtroppo, sia i modelli organizzativi, che l'intero pacchetto della formazione non ha avuto ancora una regolare ed omogenea implementazione presso le regioni e le Asl, tanto che questa viene svolta ancora con un'episodicità irregolare e spesso ristretta alle sole Asl sede del carcere. Quindi il modello sia organizzativo, che formativo viene ad essere molto irregolare specialmente a livello di interazioni tra diverse professionalità, a fronte di un'alta specificità del contesto assistenziale, declinata ulterior-

mente all'interno dello stesso contesto (es. gestione dell'assistenza in strutture con grandi numeri, Istituti per minori, Istituti femminili, ecc.).

La nostra associazione, in questi anni sta portando avanti programmi di formazione a più livelli esperienziali: studenti, laureati, operatori di ruolo, cultori della materia, ecc. con collaborazioni attive presso le Università (Roma Tor Vergata e Sapienza, Università Cattolica, Università di Genova, di Pavia, di Padova ed altre). Altre partnership efficaci sono state realizzate con enti di volontariato e di promozione sociale sempre per la realizzazione di eventi formativi e informativi in tema di medicina e tutela della salute nelle strutture penitenziarie. Una vasta serie d'iniziative è riportata sul sito della associazione (www.conosci.org). Attraverso uno specifico accordo operativo con il Dipartimento di Prevenzione della Facoltà di Medicina dell'Università Federico II di Napoli, nell'anno accademico 2017-18, si è svolto il primo Corso di Perfezionamento in Medicina Penitenziaria aperto a tutti gli operatori del settore indipendentemente dal tipo di formazione, proprio nella prospettiva di valorizzare una formazione specialistica interdisciplinare ed interprofessionale.

RIFERIMENTI ESSENZIALI

- Testoni, G. Francioli, G. Biancalani, S. Libianchi, H. Orkibi: "Critical accidents in italian prisons during the COVID-19 emergency: Stresses and strategies of healthcare personnel". Frontiers, 04 febbraio 2021 | <https://doi.org/10.3389/fpsyg.2021.619687>
- Libianchi S., et al.: "Vaccinazione contro COVID-19 nelle comunità residenziali in Italia: priorità e modalità di implementazione ad interim". Versione dell'8 luglio 2021. Roma: Istituto Superiore di Sanità; 2021 (Rapporto ISS COVID-19 n. 16/ 2021)
- M. Musolino, S. Libianchi: "Un modello per la gestione del rischio clinico (GRC) in ambito penitenziario"
- Mancinelli R., Chiarotti M., Libianchi S. (a cura di): "La salute nella POLIS carceraria. Evoluzione della medicina penitenziaria e nuovi modelli operativi". Istituto Superiore di Sanità, Rapporti ISTISAN, 2019.
- Forum Risk management, 17° edizione, Arezzo, 22-25 novembre 2022.
- S. Libianchi, M. Musolino, R. Mancinelli, M. Fasoli: "Studio di fattibilità di un programma di informazione e sensibilizzazione sui temi della medicina penitenziaria per gli studenti del 4°, 5° e 6° anno del corso di laurea in Medicina". Recenti Prog. Med. 2023; 114: 45-46.
- Maccari A., S. Libianchi: "L'assistenza Infermieristica in carcere"; 'Salute e Territorio' anno XXXIII Settembre-Ottobre 2012 n. 194, pag. 275-277.
- G. De Dominicis, L. Orsini, F. Puzilli, A. Silvestri, S. Libianchi: «L'assistenza infermieristica per le persone con disturbi mentali» in F. Burla: Manuale di psicologia clinica e psicopatologia, Piccin ed. 2014 pp. 351 - 366.

(1) Coordinamento Nazionale Operatori per la Salute nelle Carceri Italiane – Centro Studi Penitenziari (Co.N.O.S.C.I. – www.conosci.org)

(2) Coordinatore Inf.co Presidio Sanitario Casa Cir.le di Poggioreale (ASL Napoli 1 Centro)- Docente di Infermieristica Università Federico II - Luigi Vanvitelli.

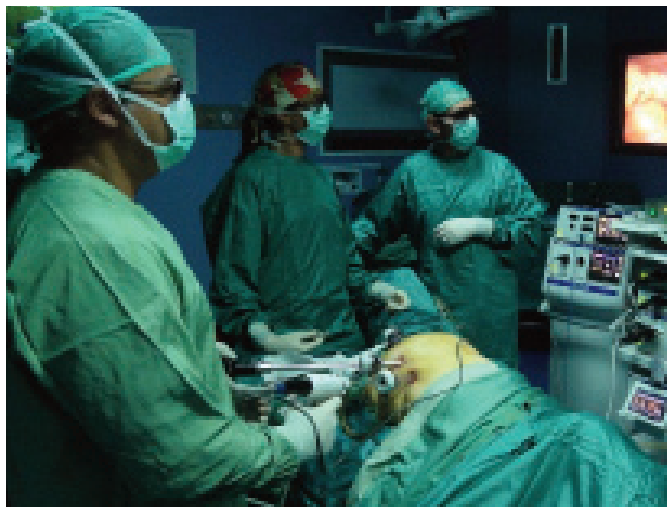
(3) Infermiera Tutor clinico e docente in Pedagogia Generale Sociale del corso di laurea triennale infermieristica, Università di Tor Vergata. Roma.

(4) Risk Manager ASL Roma 3.

Revisioni e aggiornamenti

“La pancreasectomia distale in chirurgia laparoscopia”

di SALVATORE ERRICO



Lil pancreas è un organo posto nella cavità addominale e difficilmente accessibile. La localizzazione retroperitoneale del pancreas e i suoi intimi rapporti con importanti strutture anatomiche che lo circondano, rendono la chirurgia pancreatiche particolarmente complessa.

Nella chirurgia tradizionale del pancreas la pancreasectomia distale costituisce un intervento relativamente più semplice con incidenza di morbidità e mortalità inferiori se paragonate a quelle della chirurgia del pancreas cefalico.

L'accesso tradizionale laparotomico richiede, inoltre un'intensa incisione addominale (xifo-ombelicale o bi-sottocostale) che generalmente comporta una considerevole sintomatologia dolorosa nel post-operatorio ed una lenta ripresa delle comuni attività senza contare le possibili complicanze a carico dell'incisioni (infezioni-laparocoele).

Un accesso laparoscopico mini-invasivo, quando è possibile, è senza dubbio da preferire in particolare

nella chirurgia del pancreas distale laddove, a fronte di patologie tutto sommato rare (basso numero di casi per anno), le nuove tecniche (conservazione della milza e dei vasi splenici) hanno portato persino ad un aumento nella richiesta di skill tecnico dell'operatore.

La resezione distale del pancreas e l'enucleazione in chirurgia mini-invasiva rappresenta l'opzione terapeutica migliore per le lesioni localizzate a livello del corpo e della coda.

Le condizioni anatomiche favorevoli di tale porzione dell'organo, consentono una dissociazione e sezione accurata di essa, riducendo a minimo il numero di complicanze. Una delle complicanze più frequenti è rappresentata da una lesione delle strutture vascolari spleniche (arterie e vena) in quanto decorrono rasenti all'estremità superiore del pancreas. In questo caso si provvede alla legatura e sezione sia prossimale che distale della vena e dell'arteria splenica, cioè in entrambi i lati del pancreas resecato. La milza può essere lasciata in situ dato che il suo apporto vascolare viene anche assicurato attraverso i vasi gastrici brevi ed il legamento splenocolico.

La maggioranza dei chirurghi, preferisce in questa evenienza, onde evitare pericoli di necrosi e di ascessi splenici procedere di conseguenza ad una splenopancreasectomia distale (en bloc) laparoscopica.

Indicazioni chirurgiche: tumori (neuroendocrini e cisto adenomi).

Entrambi rappresentano patologie benigne o comunque a bassa malignità.

La laparoscopia non ha indicazioni in quelle lo-

Revisioni e aggiornamenti

calizzazioni a livello della testa della ghiandola, in quanto a causa degli intimi rapporti con strutture anatomiche importanti richiede tempi chirurgici molto lunghi.

La difficoltà è legata **alla fase demolitiva** con asportazione della testa del pancreas, cistifellea (sezione vie biliari principali) del duodeno e dello stomaco e **alla fase ricostruttiva**:

pancreatico digiunostomia, coledoco digiunostomia e gastro digiunostomia su ansa alla Roux. La complessità di tale intervento a causa delle difficoltà tecniche che comporta è riservata a pochi centri di riferimento altamente specializzati come il nostro (A.O. Dei Colli, presidio Monaldi di Napoli, U.O.C. di Ch Generale, Centro Chirurgia Mininvasiva e Robotica diretto dal professore Diego Cuccurullo) dove chirurghi di grande esperienza sono in grado di eseguire questo tipo di intervento in laparoscopia con la stessa precisione utilizzata nella laparotomia tradizionale.

Di seguito è riportato il protocollo infermieristico in uso presso il nostro centro:

– **Posizione e preparazione del paziente:**

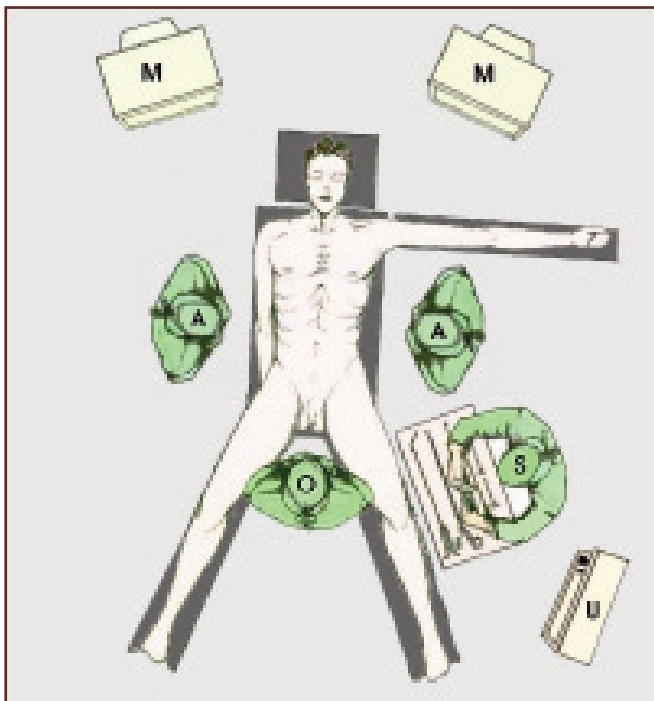
Il paziente è in posizione supina e gambe divaricate. Le braccia lungo il corpo. Il tavolo operatorio deve consentire posizione di trendeleburg e di anti-trendeleburg fino a 35° e lo stesso lateralità sinistro e destro. E' consigliabile l'utilizzo di due monitors, posizionati ai lati della testa del paziente.

E' indispensabile l'ecografo (posizionato alla destra dell'operatore).

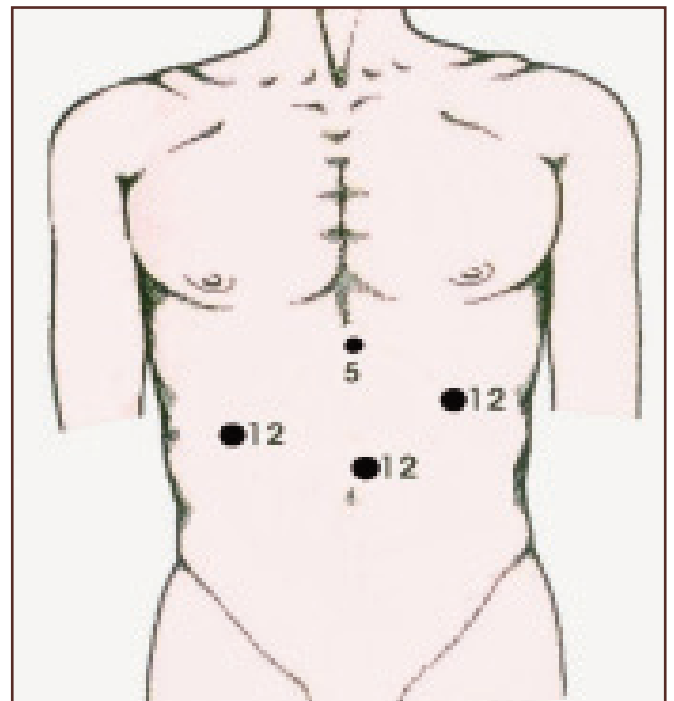
Sono altresì indispensabili sistemi di coagulazioni e dissezioni (Armonic, thunderbeat).

– **Posizione degli operatori e dello strumentario di sala operatoria:**

Il primo operatore si posiziona tra le gambe del paziente, un assistente alla sua sinistra, un secondo alla sua destra, lo strumentista a destra tra l'operatore e l'assistente.



**Posizione paziente e attrezzature
nella pancreasectomia distale**



Posizione trocar

Revisioni e aggiornamenti

Strumentario laparoscopico:			Presidi:
	Diametro	Quantità	
Siringa con 2cc sol. Fisiologica			Cavo x elettrobisturi.
Ago di Veress			Tubo x aspirazione e irrigazione.
Hasson	10-12mm	n° 1	Soluzione fisiologica x irrigazione.
Trocar	10-12mm	n° 2	Soluzione sterile calda (ottica).
Trocar	5mm	n° 1	Fettucce di gomma colorate 7cm.
Johann	5mm	n° 2	Endo-bag 15 o 10mm (sacchetto)
Grasper	5mm	n° 1	Colla di fibrina (tissucol)
Delaitre (passafilo)	10mm	n° 1	Drenaggio 21 freanch
VI ideoendoscopio 30° 3D	10mm	n° 1	
Pinza thunderbeat o Forbice ultracision	5mm	n° 1	Materiale sanitario:
Portaghi x laparoscopia	5mm	n° 1	Garze-Lunghette 15x2,5cm
Pinza bipolare (Mouiel)	5mm	n° 1	
Cannula x aspirazione e irrigazione	5mm	n° 1	
Divaricatore a branche multiple	10mm	n° 1	
Ferri x approccio laparoscopico:			
Pinza anatomica		n° 2	
Manico da bisturi lama 11		n° 1	
Kocher curvi		n° 4	
Klemmer curvi		n° 2	
Forbice - media - curva (Metzenbaum)		n° 1	
Pinza anello		n° 1	
Divaricatore di Langebeck		n° 2	
Pinza x pulizia		n° 1	
Coppetta		n° 2	
Backhaus		n° 4	
Suture metalliche:			SUTURE:
Endoclip	10mm	medie	Sutura sintetica assorbibile
Endoclip	12mm	large	(Acido Poliglicolico o PDS)
Suturatrici taglie e cucì 45	12mm		Cal. 2/0 ago composite (20cm)
(carica verde)			Cal 0 ago 5/8 cerchio,
			Cal 2/0 ago 3/8 cerchio

Revisioni e aggiornamenti**Ferri x una mini laparotomia:****Quantità**

Pinza anatomica	n° 2
Pinza vascolare	n° 1
Pinza x coagulo	n° 1
Forbice media-curva (Metzenbaum)	n° 1
Manico da bisturi (lama 21)	n° 1
Klemmer curvi	n° 4
Kocher curvi	n° 6
Passafilo	n° 1
Pinza ad anello	n° 2
Portatamponi	n° 2
Portaghi	n° 2
Forbice di Mayo	n° 1
Divaricatori tipo Mathieu	n° 2
Divaricatore autostatico (Gosset)	n° 1
Elettrobisturi	n° 1
Aspiratore	n° 1
Tubo di drenaggio 20 french	n° 1

Suture:**Sutura sintetica assorbibile (acido poliglicolico):**

Cal. 3/0 libero
Cal. 2/0 libero
Cal. 3/0 ago ½ cerchio
Cal. 0 ago ½ cerchio (**Polidiosadone**)
Cal 3/0 ago 3/8 cerchio

Sutura sintetica non assorbibile (seta, poliestere e poliammide):

Cal. 3/0 ago 3/8 cerchio

Revisioni e aggiornamenti***Note di tecnica chirurgica nelle pancreasectomie distali:***

Pneumoperitoneo open veress assistito .

Esplorazione della cavità addominale.

Sezione del legamento gastro-colico e accesso alla retrocavità degli epiploon.

Sezione dei vasi gastro-epiploici di sx su clips metalliche.

Esposizione del pancreas sull'ileo splenico.

Si procede in senso latero-mediale liberandolo dai vasi splenici inoltre tutti rami affluenti al pancreas vengono sezionati e legati con clips metalliche.

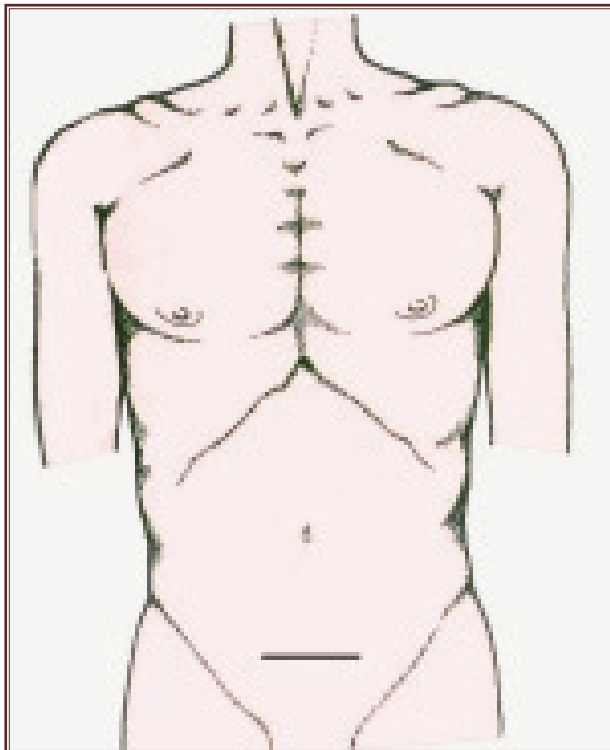
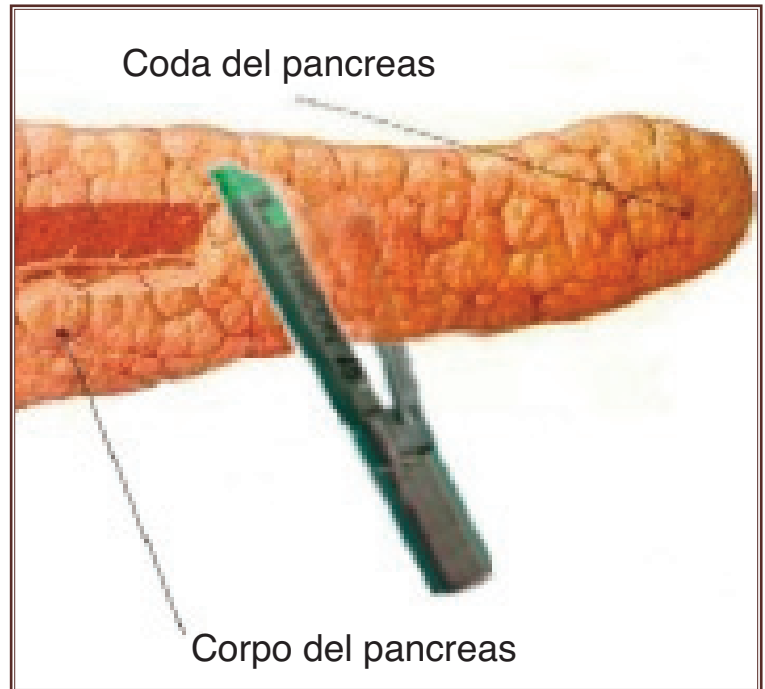
Si procede alla liberazione dell'angolo duodeno-digiunale.

Preparazione dei vasi splenici prossimali.

Sezione del pancreas in corrispondenza del corpo con suturatrice lineare tagli e cucì 45 mm (standard).

Il pezzo anatomico viene posizionato in un sacchetto da 10 cm o 15 cm del trocar.

Tubo di drenaggio.



Minilaparotomia di 5cm in regione sovrapubica per l'estrazione del pezzo.

Rapida mobilizzazione del paziente, rimozione del drenaggio in terza giornata, in quinta o sesta inizia ad alimentarsi con dieta tenue e in settima giornata viene dimesso.

Minilaparotomia sovrapubica

Ospedali & territorio

Castellammare, un ospedale al posto delle terme

Napoli - La Giunta regionale della Campania ha approvato lo Schema di Accordo con la Commissione Prefettizia del Comune di Castellammare di Stabia per l'acquisizione al patrimonio regionale del compendio che ospita le Terme "Nuove" di Castellammare, e ha programmato risorse per complessivi 180 milioni di euro, a valere sul POR FESR 2021-2027, per l'acquisto e la realizzazione della nuova cittadella ospedaliera di Castellammare. L'edificio abbandonato e chiuso dal 2015 sarà acquistato dalla Regione, un'operazione da 180 milioni (fondi Ue) che riguarda un ampio complesso composto da un edificio centrale, l'albergo, il centro congressi, il parco idroponico e Villa Ersilia. Tutti beni di proprietà della società immobiliare terme di Stabia (Sint), oggi in liquidazione e con un debito di oltre 20 milioni di euro. In questo processo di lenta alienazione dei beni funzionali al termalismo si è inserito il progetto pensato e voluto dalla Regione e dalla commissione prefettizia di Castellammare (il Comune è commissariato). I beni che passeranno alla Regione per realizzarvi l'ospedale saranno l'albergo e il plesso delle Nuove Terme, mentre il Parco idroponico, Villa Ersilia e il centro congressi resteranno alla città.



IL POLO - Il nuovo polo ospedaliero sarà un Dea di secondo livello, come spiega il direttore sanitario dell'Asl Napoli 3 Sud. «Realizzare il nuovo San Leonardo significa raddoppiare posti letto (150 attivi attualmente) e servizi. Oggi non abbiamo gli spazi per aprire nuovi reparti perché stretti tra i palazzi e affacciati su una zona fin troppo trafficata», dice Giuseppe Russo «Il nuovo ospedale avrà nuove specialistiche e assieme all'ospedale unico della Penisola sorrentina darà

garanzie nelle cure coprendo anche le zone che confinano con il Salernitano e la costiera amalfitana». Insomma, due progetti che serviranno finalmente a innalzare l'offerta sanitaria di una delle Asl più grandi della regione con un milione e centomila utenti e 13 distretti. «Superata l'emergenza che riguarda la mancanza di personale che sta vivendo tutta la sanità italiana - conclude il direttore sanitario - puntiamo a riaprire al più presto anche l'ospedale di Boscotrecase».

Ospedali & territorio



A Napoli le radiografie anche domiciliari

Napoli - Pesa soltanto 2 chili e 400 grammi, misura 26 centimetri per 16 e grazie a una comoda custodia è facile da portare. Con questo apparecchio, piccolo, ma molto potente, grazie a un generatore da 70 Kv, un tubo radiogeno grande quanto una moneta con macchia focale ad alta risoluzione, tutti gli ammalati oncologici dell'Istituto dei tumori di Napoli Pascale potranno usufruire del servizio di radiologia domiciliare. Anche quelli che risiedono in abitazioni difficili da raggiungere dai classici portatili e a cui spesso era inibito un servizio in vigore già da anni e che rientra nell'ambito del Progetto di Assistenza h 24 del ministero del Lavoro, della Salute e delle Politiche Sociali. Lo rende noto il Pascale di Napoli. «Il progetto va avanti da molti anni - dice Antonella Petrillo, direttore della Struttura Complessa della Radiologia del Pascale - e in molti casi abbiamo riscontrato difficoltà a raggiungere le abitazioni dei pazienti con i classici portatili perché residenti in vecchie palazzine senza ascensore con rampe di scale molto strette come, per esempio, quelle dei Quar-

tieri Spagnoli. Con l'acquisto di questo portatile ora tutti gli ammalati oncologici del nostro Istituto potranno usufruire di questo servizio a casa». Ottimi i vantaggi dall'utilizzo del servizio di radiologia domiciliare.

Vantaggi di tipo economico, sociale e relazionale. Fornire al paziente un servizio domiciliare di radiologia permette infatti di prevenire e in alcuni casi evitare del tutto i costi inappropriati scaturiti dal rivolgersi a strutture private o facendo ricorso al pronto soccorso. I vantaggi di tipo psicologico ed emotivo, non quantificabili economicamente, hanno risvolti a volte anche diretti sulla malattia. Alcuni pazienti se mantenuti nel contesto familiare, mantengono o trovano l'equilibrio e la serenità utili per affrontare la malattia stessa. I pazienti in stato terminale molto spesso chiedono di tornare a casa, in questo caso costringerli a rimanere in reparto per poter effettuare gli esami programmati risulta essere un peso enorme per chi subisce la situazione e per i familiari.

Asl Napoli 2 Nord, un tour per la prevenzione

Napoli - «Guarda al futuro, previeni!» è lo slogan della nuova campagna itinerante di screening gratuito per i tumori della mammella, colon retto e cervice uterina, che l'Asl Napoli 2 Nord sta effettuando a partire da sabato 9 settembre. Il truck dell'Asl, dotato di ambulatori mobili, apparecchiature e personale specializzato toccherà nei mesi di settembre e ottobre tutti i comuni del territorio dell'azienda sanitaria, sostando nei centri interessati dalle 9:30 alle 18:00.

Una scelta strategica, viene spiegato, nell'ottica della sanità di 'prossimità', in sinergia con gli enti territoriali: obiettivi, avvicinare l'utenza interessata per mezzo di un accesso diretto e diffondere la cultura della prevenzione. Target della campagna la popolazione femminile e maschile modulata, per tipo di screening, dai 25 ai 74 anni. Quello per la cervice



uterina (pap test) è rivolto alle donne in età compresa tra i 25 e 64 anni; lo screening mammografico si rivolge alla popolazione femminile tra 50 e 69 anni; la prevenzione del tumore al colon retto intende raggiungere donne e uomini tra i 50 e 74 anni, mentre lo screening contro il melanoma interessa donne e uomini di tutte le età. Sarà possibile inoltre, per l'utenza femminile dagli 11 ai 25 anni, effettuare la vaccinazione contro il papilloma virus; per tutti, la visita dermatologica con eventuale nevoscopia in presenza di macchie cutanee sospette. Prime date il 9 e 10 settembre con sosta dalle 9.30 alle 18.00 presso il centro Commerciale «Grande Sud» nel territorio di Giugliano, cui seguiranno date a Casalnuovo, S. Antimo, Cardito, Afragola, Quarto, Marano, Mugnano, Casoria e Melito. Nel mese di ottobre verranno raggiunti tutti gli altri comuni della Asl Napoli 2 Nord.

Ospedali & territorio

Tumori vie biliari, una speranza dal Pascale



Napoli - Sono tremila le persone che vi si ammalano ogni anno, un numero in continuo aumento. Le cause delle neoplasie delle vie biliari sono sconosciute e la chemioterapia, unica cura finora riconosciuta, non sempre risponde. Nel tentativo di dare nuove speranze ai pazienti affetti da colangiocarcinoma l'Istituto dei tumori Pascale di Napoli ha dato il via ad

una cura che se darà i risultati auspicati ha tutte le carte in regola può rappresentare una svolta. Questo studio, denominato

Citazione, adotta una strategia promettente, si legge in una nota del Pascale: la terapia 'neoadiuvante' basata sull'immunoterapia. «In questa innovativa ricerca, ai pazienti viene somministrata una combinazione di due farmaci

immunoterapici (Durvalumab e Tremelimumab) insieme con la chemioterapia convenzionale prima dell'intervento chirurgico. - si spiega - L'immunoterapia stimola il sistema immunitario per combattere le cellule tumorali e, allo stesso tempo, migliora l'efficacia dell'azione antitumorale della chemioterapia.

Questa tattica offre numerosi vantaggi tra cui la riduzione delle dimensioni del tumore per consentire una resezione chirurgica più efficace e il controllo precoce delle micrometastasi. L'obiettivo è che questo studio possa aprire nuove prospettive terapeutiche per i pazienti affetti da questa malattia insidiosa». Oltre all'Istituto Tumori, ideatore e coordinatore dello studio, parteciperanno al progetto 5 Gruppi Italiani: Università di Napoli «Federico II», ospedale Cardarelli, ospedale San Camillo Forlanini/Spallanzani, ospedale Mauriziano, Umberto I°, Università di Verona, ospedale Borgoroma.



Prima Tac aperta ad utenti esterni alla Napoli 3 Sud

VICO EQUENSE - Per la prima volta all'ospedale De Luca e Rossano di Vico Equense, (Napoli) è attiva una Tac il cui utilizzo è aperto anche agli utenti esterni. A spiegarlo è l'Asl Napoli 3 Sud che, attraverso una nota, sottolinea come la novità ambulatoriale presso il nosocomio il cui direttore sanitario è Giuseppe Lombardi. Si tratta di esami diagnostici Tc del cranio-addome, Tc con tecnica HR - alta risoluzione - del torace, esami osteoarticolari e dentalscan. Le sedute vengono programmate a cadenza settimanale, anche con utilizzo del mezzo di contrasto per diagnosi sempre più approfondite e dettagliate:

l'accesso al servizio avviene tramite prenotazione al centro unico con impegnativa del medico curante. Gli esami sono fruibili gratuitamente per i pazienti con esenzione ticket: "Si tratta di interventi di assoluto rilievo - spiega il direttore generale dell'azienda sanitaria, Giuseppe Russo - rivolti ad aumentare in misura sostanziale la qualità dell'assistenza nell'intera area della penisola sorrentina. La nostra attenzione è rivolta non solo alla popolazione stanziale, ma anche ai tantissimi turisti che ogni anno affollano le località peninsulari. Da questo punto di vista la Tac a Vico Equense va letta solo come un primo passo verso un vasto programma di implementazione dei sei servizi sanitari in un territorio tanto complesso dal punto di vista morfologico, quanto importante sotto il profilo sociale ed economico".

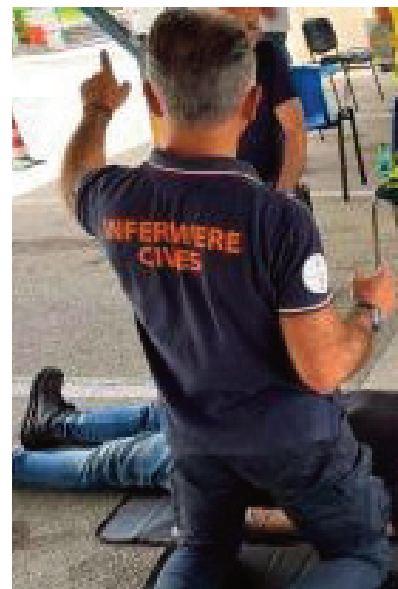
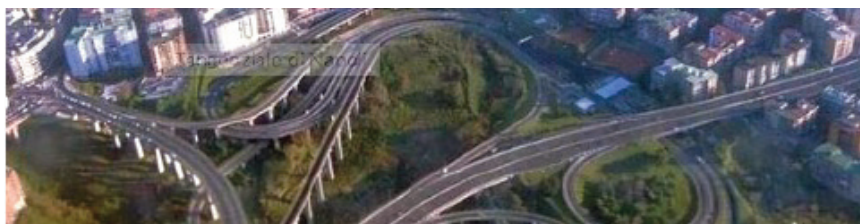


Tangenziale di Napoli, installati i defibrillatori

Numerosi defibrillatori sono stati installati lungo la rete stradale della Tangenziale di Napoli (20,2 km). L'iniziativa è nata per contrastare l'arresto cardiaco improvviso e garantire sicurezza a un flusso di traffico di circa 270.000 attraversamenti giornalieri.

I defibrillatori sono posizionati in teche allarmate altamente **funzionali** e dal design innovativo, proprio per

rendere gradevole e ben visibile la loro presenza. Le rivoluzionarie **teche Ro-taid** migliorano l'efficacia del defibrillatore al suo interno, grazie alla connettività online 4G, che riduce i tempi di risposta e massimizza le possibilità d'intervento rapido. In questo modo, i defibrillatori installati sono monitorati da remoto e accessibili 24 ore su 24, garantendo un sistema salvavita sostenibile ed efficace.



Ospedali & territorio

L'ospedale Betania, un drappello di pubblica sicurezza



Napoli - "Così come deciso dal ministero dell'Interno per altri presidi di frontiera della nostra città, chiediamo che anche il nostro pronto soccorso sia dotato di un drappello di pubblica sicurezza". A parlare è Enzo Bottino, direttore sanitario dell'ospedale evangelico Betania, struttura posta nel quartiere Ponticelli di Napoli. "Le continue aggressioni violente ai danni di medici, infermieri e operatori sociosanitari e guardie particolari giurate addette alla vigilanza - afferma - stanno mettendo in ginocchio il nostro pronto soccorso".

Per questo motivo Bottino chiede "un incontro con il nuovo questore di Napoli, Maurizio Agricola, per affrontare e dirimere questa situazione, ormai non più tollerabile per il nostro ospedale. Violenze e devastazioni si susseguono a cadenza impressionante e sono diventate ingestibili dal personale interno". Dall'ospedale fanno sapere come "le devastazioni dei locali vengono riparate a spese dell'osped-

ale" e anche che "gli operatori sanitari del pronto soccorso sono fortemente preoccupati e temono per la incolumità quando sono in servizio per curare i pazienti che accedono al nostro presidio, alcuni dei quali affetti da patologie acute e gravissime, che abbisognano di cure immediate e tempestive. Il caos che si genera a ogni aggressione può ritardare

trattamenti salvavita e può provocare esiti imprevisti nei pazienti che annoverano la quali precedenza codici rossi dopo il triage. Pazienti meno gravi devono attendere i tempi previsti dal triage e questo purtroppo genera un ingiustificato malesere nei familiari, che senza alcuna remora si scagliano contro gli incolpevoli operatori".

MINISTERO SALUTE**Francesco Vaia nuovo direttore generale Prevenzione**

È Francesco Vaia, direttore generale dell'Istituto nazionale per le malattie infettive Lazzaro Spallanzani di Roma, il nuovo Dg Prevenzione del ministero della Salute. Laureato in Medicina all'Università Federico II di Napoli, specializzato in Statistica sanitaria a Roma, Vaia ha 68 anni ed era in «pole» per la Prevenzione nel toto nomine sulle imminenti decisioni del ministro della Salute Orazio Schilacci. Il decreto di nomina era stato inviato nei giorni scorsi alla Corte dei conti.

Vaia succede a Gianni Rezza che ha lasciato la direzione generale nel maggio scorso dopo essere stato nominato al vertice dall'ex ministro Roberto Speranza sempre nel maggio 2020, nei primi mesi della pandemia.

***Evaluation of M-Health
on Medication Adherence
in Tuberculosis Patients:
A Systematic Review***

***Music Therapy for Pain
and Anxiety in Hospitalized Children:
A Systematic Review
of Randomized Controlled Trial***

***Healthy Nurses:
Tips for Enhancing Mental, Emotional,
and Spiritual Well-being***

***Systems compared:
Capillary glucose
self-monitoring
and Flash glucose
monitoring system.
Cross-sectional study***

***Workplace Violence
Experienced by Nurses
in Northern Region Hospitals
of Morocco:
A Cross-Sectional Study***

**Evaluation of M-Health On Medication Adherence In Tuberculosis Patients:
A Systematic Review**

Rd. Mustopa^{1*}, Damris², Syamsurizal², M. Dwi Wiwik Emawati²

¹Department of Medical Laboratory Technology, Health Polytechnic of Jambi, Jambi, Indonesia

²Doctoral Study Program, Faculty of Mathematics and Natural Sciences, Jambi University, Jambi, Indonesia

Corresponding author. Rd. Mustopa, JL. Haji Agus Salim Nomor 09 Kota Baru - Jambi 36361, Indonesia.

Orcid : <https://orcid.org/0000-0002-6407-1452>.

Phone: +62 821-9668-7959

Email: rdmustopa979@gmail.com

Review article

DOI: [10.32549/OPI-NSC-91](https://doi.org/10.32549/OPI-NSC-91)

Submitted: 21 February 2023

Revised: 26 March 2023

Accepted: 04 April 2023

Published online: 19 April 2023

This article is licensed under the Creative Commons Attribution - Non Commercial - No Derivatives 4.0 (CC BY NC ND 4.0) international license.

ABSTRACT

Background & Aim: The success of the TB control program is closely related to patient adherence to treatment. Previous studies have provided many views regarding the use of variants of mHealth on TB patient adherence, but the results still need to be clarified. This review aims to evaluate and provide an overview of mHealth RCTs on medication adherence in the patient with tuberculosis.

Methods & Materials: The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guideline was followed to report study findings. A literature search for studies in the period of 2018-2022 in PubMed, Cochrane, CINAHL and Sciencedirect databases was conducted. Randomized controlled trials (RCTs) that analyzed the effect of mHealth on medication adherence outcomes (treatment completion, treatment adherence, missed doses, and non-completed rate) were included. Adult patients with either active or latent TB infection were included. The Cochrane 'Risk of bias' assessment tool was used to assess the risk of bias of eligible studies.

Result: Overall, searches on databases generated 2,607 articles, and only 18 articles met the criteria. Two authors independently screened and extracted data from eligible studies. There are two devices used in mHealth in the last five years: software (SMS, We chat, and Whatsapp) and hardware (MERM, eDOT, WOT). Based on descriptive analysis, the hardware mHealth is superior to the software mHealth. Close monitoring and measurement of the use of DOT hardware demonstrates the accuracy of treatment success.

Conclusion: It was found that mHealth interventions can be an advantageous approach. However, the interventions showed variable effects regarding the direction of effect and the rate of improvement of TB treatment adherence and clinical outcomes.

Keywords: Tuberculosis; eHealth; digital health; Adherence; digital adherence.

INTRODUCTION

Tuberculosis is a disease that requires the sufferer's adherence to a standardized treatment program to completely get rid of *Mycobacterium*, which is the main cause of this disease, from the sufferer's body [1–3]. A total of 1.6 million people died from TB in 2021 (including 187,000 people living with HIV). Worldwide, TB is the 13th leading cause of death and the second infectious killer after COVID-19 (above HIV/AIDS). TB is a treatable and curable disease. Drug-susceptible TB disease is treated with a standard 4-month or 6-month course of 4 antimicrobial drugs (isoniazid and rifampicin) that are provided with support to the patient by a health worker or trained treatment supporter [4]. The high number of TB cases worldwide is part of patient non-adherence with treatment programs, which allows for an increase in new TB cases [5]. Non-adherence of TB patients to treatment can be seen from the large number of TB patients who are resistant to standard therapy or what is known as Drug Resistant-Tuberculosis (DR-TB). There are 157,903 Drug Resistant-Tuberculosis (DR-TB) cases in 2020 [6]. To overcome this situation, since 1995 WHO has introduced the DOTs (Directly Observed Treatment, Short-course) strategy. The study states that knowledge is the biggest variable in this aspect of non-adherence, without neglecting other variables such as attitudes and behaviour of TB patients [7]. For this reason, the focus of TB control should be on increasing compliance and changing patient behaviour [8].

The World Health Organization (WHO) has provided a good strategy for managing TB, primarily targeting patient compliance, which has long been known as Directly Observed Treatment (DOT). The strategy consisted of standard treatment using Rifampicin for six months for new cases and eight months for repeat cases [9]. These repeat cases were patients who had dropped out of treatment or failed to undergo previous treatment [10,11]. So, the DOT strategy and program are fine. This strategy requires a better approach and is adapted to the conditions of society. The limitations of the officers who will run this program should be a consideration for the birth of innovations to find which approach is better to do to significantly improve and change the

compliance and behaviour of TB patients [12,13]. The birth of a very progressive digital technology that began in the 20th century can be the main choice in solving the problem of treating tuberculosis in the community through innovations in delivering pre-existing programs [14]. In several decades, studies on the use of digital technology to improve TB patient adherence and behaviour have increased sharply in various parts of the world.

The term commonly known today for using mobile devices to support public health care and practice is 'mHealth, as introduced by WHO. mHealth also includes all mobile devices that use wireless or Bluetooth technology [9]. mHealth is particularly suitable for adherence interventions, as it involves using devices such as smartphones, Personal Digital Assistants (PDAs), tablets and many others [15–18]. These devices support several media, such as Short Messaging Services (SMS) or text messaging, voice or video calls, and specialized software applications (Apps) [15]. Previous studies involving mHealth included Liu and his team, who used a telephone reminder system to increase TB patient compliance [11]. In addition, there are studies using media SMS to serve as reminders for TB patients with good results [19–21].

Based on our initial search of the available studies, the results still need to be clarified. There are no results that show the certainty of the effectiveness of mHealth used. In addition, most of the studies over the five years showed that mHealth variations were similar. Likewise, previous review studies evaluate a lot from just one mHealth variant. To that end, the current review aims to evaluate and provide an overview of mHealth RCTs on medication adherence in the patient with tuberculosis.

METHODS

Design

This review was compiled based on the 2020 Preferred Reporting Items for Systematic-review and Meta-Analysis (PRISMA) guidelines [22].

Eligibility Criteria

This review was restricted to studies published in English, and included studies published through 2018 to 2023. Study types were limited to RCTs. In this review, an intervention for adherence and behaviour were defined as any strategy (e.g., self-management for diseases, and medication reminder) to change or maintain patient's adherence and behaviour to improve health. We included studies on interventions that used mobile devices (wireless and portable electronics including cellular phones, wearable devices, laptop, personal assistance devices, and tablet PC) or mobile technologies (any technologies that enable communication with remote areas, such as phone call, video call, short messaging service [SMS], multimedia messaging service, online-chat, and email) to promote medication adherence. Observational study, non-intervention study, case report, study protocol, and commentary were excluded in this review.

Information Source

A literature search was performed on several reputable databases, such as PubMed, Sciencedirect, CINAHL, and Cochrane. The search was carried out in the period November 2022 to January 2023.

Search Strategy

The keyword structure was compiled based on study population, intervention, comparison, outcome, and design were developed for the specific databases used. The search strategies for each database provided in the search string table (Table 1).

Selection Process

Two authors independently screened all titles and abstracts from the collected literature. Then read the entire text of each article to assess its eligibility based on predetermined inclusion criteria. Discrepancies that arise are resolved through discussion, even if it is possible to ask for the

consideration of the first author. The selection process is described in detail in the PRISMA diagram.

Database	Keywords Combination
PubMed	(“technology”[tw] OR “digital adherence”[tw] OR “mHealth”[tw] OR “mobile health”[tw] OR “mobile app”[tw] OR “mobile apps”[tw] OR “mobile application”[tw]) AND (“medication adherence” [Mesh] OR “adherence”[tw] OR “concordance”[tw] OR “compliance”[tw] OR “nonadherence”[tw] OR “noncompliance”[tw] OR “nonconcordance”[tw]) AND (“tuberculosis/drug therapy”[Mesh] OR “tuberculosis infection”[tw] OR “tb”[tw] OR “active tuberculosis”[tw] OR “latent tuberculosis”[tw] OR “pulmonary tuberculosis”[tw] OR “extrapulmonary tuberculosis”[tw]).
Cochrane	(“technology” OR “digital adherence” OR “mHealth” OR “mobile health” OR “mobile app” OR “mobile apps” OR “mobile application”) AND (“medication adherence” [Mesh] OR “adherence” OR “concordance” OR “compliance” OR “nonadherence” OR “noncompliance” OR “nonconcordance”) AND (“tuberculosis/drug therapy” [Mesh] OR “tuberculosis infection” OR “tb” OR “active tuberculosis” OR “latent tuberculosis” OR “pulmonary tuberculosis” OR “extrapulmonary tuberculosis”)
CINAHL	(“technology” OR “digital adherence” OR “mHealth” OR “mobile health” OR “mobile app” OR “mobile apps” OR “mobile application”) AND (“medication adherence” [Mesh] OR “adherence” OR “concordance” OR “compliance” OR “nonadherence” OR “noncompliance” OR “nonconcordance”) AND (“tuberculosis/drug therapy” [Mesh] OR “tuberculosis infection” OR “tb” OR “active tuberculosis” OR “latent tuberculosis” OR “pulmonary tuberculosis” OR “extrapulmonary tuberculosis”)
Sciencedirect	(“technology” OR “digital adherence” OR “mHealth” OR “mobile health” OR “mobile app” OR “mobile apps” OR “mobile application”) AND (“medication adherence” [Mesh] OR “adherence” OR “concordance” OR “compliance” OR “nonadherence” OR “noncompliance” OR “nonconcordance”) AND (“tuberculosis/drug therapy” [Mesh] OR “tuberculosis infection” OR “tb” OR “active tuberculosis” OR “latent tuberculosis” OR “pulmonary tuberculosis” OR “extrapulmonary tuberculosis”)

Table 1. Search string in databases

Data Extraction

DM and SR conducted eligibility evaluation based on the title and abstract. The full texts of

potentially eligible articles were retrieved and assessed by DM, SR and MD conducted further independent verification of the abstract and full-text screening. Any disagreements among the reviewers were resolved by discussion. Data from the selected articles were extracted by DM, SR, MD and then verified by RM for relevant information, such as publication year, type of mHealth intervention, setting, population, main findings, and control groups.

Assessment of risk of bias in included studies

Two review authors independently assess the risk of bias of each included trial using the Cochrane 'Risk of bias' assessment tool, and discuss any differences of opinion (Higgins et al., 2011). In the case of missing or unclear information, we will contact the trial authors for clarification. The Cochrane approach assesses risk of bias across six domains: sequence generation and allocation concealment (selection bias), blinding of participants and personnel (performance bias), blinding of outcome assessors (detection bias), incomplete outcome data (attrition bias), selective outcome reporting (reporting bias), and other potential biases. For each domain we will record the methods used by the trial authors to reduce the risk of bias and assign a judgment of either 'low', 'high', or 'unclear' risk of bias.

RESULTS

Overall search on databases resulted in a total of 2,607 articles. After removing 2070 articles for duplication, ineligibility and other reasons, 537 articles were left ready for screening. In the end, 18 articles were declared eligible to be included in this review study after removing 16 articles for reasons including not being an RCT study, not being focused on TB, and being a protocol study.

In full regarding the process of searching for articles can be seen in figure 1, while, in table 2 we reported the characteristics of the articles included in our study

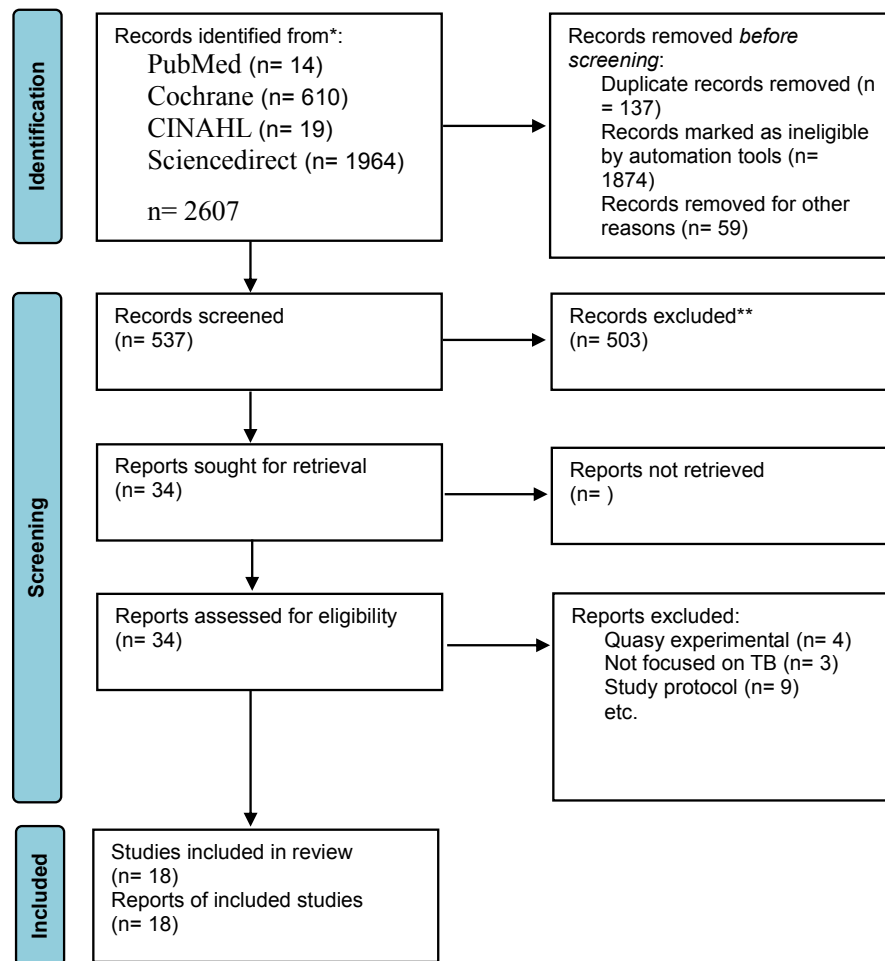


Figure 1. Flow diagram of the studies selection

Author, Year, Country	Types of participants	Types of mHealth intervention	Duration	Control	Evaluation method	Main findings
Acosta et al., 2021, Peru [23]	53 patients at the end of the first phase of the DOT-based treatment	Medication Event Reminder Monitor System (MERM) consisted of an electronic dispenser pillbox, a web server and text messaging	4 months	Administered DOT in the PHC by a nurse from the TB programme staff, who supervised treatment administration in the patients' mouth and recorded it in the	Treatment completion	- Treatment success 1.15 (1.02–1.30) (P-value 0.0322) - Patients who missed at least one dose 0.79 (0.40–1.56) (P-value 0.498) - Patients with 10% of total doses missed 0.15

				TB treatment register as specified in the national guidelines		(0.02–1.21) (P-value 0.0613)
Ali & Prins, 2019, Sudan [24]	Newly diagnosed, smear positive pulmonary TB Cases= 74 Control= 74	Text messages every 48 hours during the first 2 months and hereafter weekly till the end of treatment. Telephone call at least once during the first week of their treatment	6 months	Standard of care	Face to face interview	The patients in the intervention group had higher cure rate 58 /74 (78.4.0%) compared to 44 (59.5) of the 74 patients in the control group (P-value 0.020; OR: 2,472, 95% CI:1.133 – 5.434).
Bao et al., 2022, China [25]	Newly diagnosed active pulmonary TB, and hospitalized. Intervention= 59 Control= 53	Health education in WeChat groups, web-based health education lectures, and receiving health education plans as well as routine medical and nursing care such as supervision of their medications, which continued for 1 month	3 months	Routine medical and nursing care in the TB clinic, including supervision of their medications. Meanwhile, the pharmacist also created a WeChat group for the control group to allow patients to communicate with each other but without any intervention.	Web-based questionnaire, a self-designed structured scale	Self-management of health behaviours (P<.001)
Bediang et al., 2018, Cameroon [26]	Newly diagnosed SS + PTB Intervention= 137 Control= 142	The usual care (selective DOT) and free and daily SMS reminders	6 months	The usual care (selective DOT)	a self evaluation questionnaire	SMS reminders do not statistically significantly increase proportions of the treatment success at 5 months (OR =1.45 [0.81, 2.56]; p = 0.20) and the cure at 6 months (OR= 0.96 [0.59–1.57]; p = 0.88)
Boutilier et al., 2022, Kenya [27]	Patients being bacteriologically diagnosed with TB by smear microscopy, culture or GeneXpert Intervention=609	Patients received an SMS message every day, reminding them to take their medication. Patients were expected to verify their	6 months	Standard treatment	The patient's sputum smear, treatment completion	Most effective for high- risk patients. 7.95 (95% CI 4.6 to 11.4) P<0.001

	Control=580	treatment adherence every day, using an USSD interface.				
Browne et al., 2019, US [28]	TB patients in the continuation phase of treatment who were smear-negative and taking isoniazid plus rifampin, with no evidence of drug-resistant TB, and who had complete blood count (CBC) and comprehensive panel (CMP) values Intervention=41 Control=20	Wirelessly observed therapy (WOT)	12 months	Standard of care treatment	Calculation of WOT PDA	No statistical difference between WOT and DOT arms (median 93 versus 101, p = 0.85)
Burzynski et al., 2022, US [29]	Patients with a suspected, laboratory-confirmed, or clinical diagnosis of TB disease, who were prescribed oral anti-TB medication Group 1=113 Group 2=103	Electronic DOT (live video-conferencing or recorded videos).	12 months	In-person DOT, participants chose clinic or community-based DOT	Observation form, an opinion questionnaire	- e-DOT was as effective as ip-DOT for assuring high levels of TB treatment adherence. - The percentage difference was -2.6%(95%CI, -4.8% to -0.3%)
Gashu et al., 2021, Ethiopia [30]	New drug-sensitive TB patients. 152 intervention, 154 control	In addition to routine care, received weekly pill refilling and daily medication reminders using graphics-based and text messages in the local language (Amharic)	4 months	Routine care in continuation phase TB treatment means patients take their daily medication at home with the help of TB treatment supporters (TTS)	The shorter form, 11-item Adherence to Refill and Medication Scale (ARMS)	- Adherence to patient-centred TB treatment, the difference was statistically significant (p=0.0083) - No significant difference in treatment success between intervention and control groups (p=0.1238)
Gupta et al., 2020, India [31]	Newly diagnosed Category I Tuberculosis patients on	Patient received daily SMS reminders in Hindi language under the	6 months	did not receive any SMS and followed the usual DOTS program	Interviews	- The risk of adverse outcomes was lower in intervention group vs control

	DOTS Intervention=155 Control=156	„HEAL-TB“ banner				group (OR; 95% CI: 0.57 (0.35-0.96)). - The risk of missed doses of treatment was lower in intervention group (OR; 95% CI: 0.33 (0.12-0.90))
Johnston et al., 2018, Canada [32]	Patients were diagnosed with LTBI, and starting 9 months of daily isoniazid (9INH) therapy Intervention=170 Control=188	Standard LTBI care, and The SMS intervention involved a weekly text message	12 months	Standard LTBI care	the SF-12 questionnaire	- No significant difference the proportions of participants meeting the primary end-point (P=0.550) - The median SF-12 mental composite score (p=0.471)
Kibu et al., 2022, Cameroon [33]	TB participants had a confirmed diagnosis and had been on treatment for at most 3 months. Intervention=102 Control=51	The single way (healthcare provider sends messages and expects no reply from the patient) and the double way (healthcare provider sends messages and expects a reply from the patient)	3 months	Only the treatment and the standard care provided at the treatment centres	A logbook to register all SMS text messages sent and replies received	- No differences in the Adherence to ART among the Participants in the Single Way and Double-Way SMS and the Control groups (P = 1.000) - No statistically significant difference in adherence to TB Treatment between the groups (p = 0.101 and 0.168, respectively)
Louwagie et al., 2022, South-Africa [34]	Drug-sensitive pulmonary tuberculosis (PTB) and were initiating TB treatment or had been on TB treatment for less than a month Intervention=283 Control=291	Three brief MI counselling sessions were reinforced with follow-up SMS text messages, two times per week over 12 weeks	9 months	The usual care and routine treatment and support offered to patients with TB in South Africa	The routinely collected TB treatment outcomes in patients' individual files - Sputum smear	- The OR of being cured was 1.16 (95% CI 0.83 to 1.63) in the intervention vs the control arm - The OR of taking ART medication was 2.05 (95% CI 0.80 to 5.27) comparing the intervention arm to the control arm
Manyazewal et al., 2022, Ethiopia [35]	New or previously treated, bacteriologically confirmed drug-sensitive pulmonary TB	An electronic pillbox that records adherence to treatment, stores medication,	2 months	The standard DOT practice visited the healthcare facility each day throughout the 2-month intensive	Adherence records compiled from the MERM device vs. DOT	Non-significant difference in Adherence to TB medications between the two arms (mean ratio [MR] 1.00 [95%

	Intervention=57 Control=57	emits audible and visual alerts to remind patients to take their medications, and enables healthcare providers to monitor adherence.		phase	records - Sputum smear	CI 0.99-1.01]; p = 0.954)
Manyazewal et al., 2023, Ethiopia [36]	New or previously treated, bacteriologically confirmed drug-sensitive pulmonary TB Intervention=52 Control=57	The patient instruction label was placed inside the MERM device, placed a 15-day supply of TB medication in the medication storage area of the MERM device, and gave the entire device to the participant for medication self-administration. The participants returned every 15 days	2 months	The standard DOT practice	The Treatment Satisfaction Questionnaire for Medication (TSQM v1.4©)	The GM TSQM score was significantly higher in the intervention vs the control across the three domains: global satisfaction [90.19 vs 67.11, 95% CI 1.34 (1.26–1.43), p<0.001], effectiveness [85.78 vs 63.43, 95% CI 1.35 (1.26–1.45), p<0.001], and convenience [85.41 vs 48.18, 95% CI 1.77 (1.63–1.93), p<0.001]
Nedsuwan et al., 2019, Thailand [37]	Newly diagnosed TB patient, being prescribed first-line TB drugs Intervention=50 Control=50	The CARE-call system to monitor the medication adherence. The system comprised three main components. Those were a mobile-equipped pill box called a CARE-Box for TB patients, a mobile phone for a TB clinic health staff member, and an SIM card-based computer server	6 months	TB education, post-prescription counselling by a pharmacist, pill count for medication adherence rate calculation, urine colour observation, a short interview	Focus group discussion	Treatment success between the two groups were not significantly different (p=.675) In qualitative analysis: the system can enhance good patient adherence through the four characteristics: connecting, affordable, reminding and enabling
Santra et al., 2021, India [38]	On DOTS therapy for a minimum period of 30 days and a maximum of	mHealth package comprising of 30 unique text-messages in the local language,	3 months	Standard care	MGLS	Significant differences between intervention and control group at end-line

	90 days Intervention=110 Control=110	Hindi and a weekly real-time two-way phone call that lasted for approximately 10 min.				($P<0.005$)
Wagstaff et al., 2019, South-Africa [39]	Patients who are considered possible TB cases Intervention 1 =163 Intervention 2= 155 Control=97	The first intervention group (SMS1) received a simple SMS reminder to return to the clinic to collect their TB test results The second intervention group (SMS2) received a longer SMS message reminding them to return to the clinic	3 months	Standard care	The percentage of recruits returning Cape Town's Patient Record and Health Management Information System (PREHMIS)	SMS recipients were more likely to return to clinic than the control group ($P 0.001$)
Haslinda & Juni, 2019, Malaysia [40]	Newly diagnosed with smear or bacteriological ly positive or negative pulmonary tuberculosis (PTB) Intervention=55 Control=55	TB@Clicks: 2 phases, educational phase-health education messages through WhatsApp within one-day period during intensive phase. sustainability phase-reminder messages through WhatsApp at 1-, 2-, 3-month after received the intervention module	6 months	Reminder messages through WhatsApp at 1-, 2-, 3- month after received the intervention module.	Record in Health Clinic (TBIS 10-I)	no significant difference in adherence rate between the groups ($P=0.121$) no significant difference of treatment success rate between groups ($P=0.065$) intervention module using WhatsApp has no significant effects to the adherence rate among PTB patients ($P=0.174$) the intervention group are 4.1 (95% CI = 1.16-14.87, $p=0.03$) times more likely to have successful treatment than that of patient who was not received any intervention

Table 2. *Characteristics of Studies Included*

Summary of Risk of Bias assessment

The risk of bias in eligible studies using The Cochrane Collaboration's tool resulted in the conclusion that there were four studies with a high risk of bias and one unclear.

Author	Risk of Bias Domain					
	RSG	AC	BPP	BOA	IOD	SR
Acosta et al. [23]	L	L	H	L	L	L
Ali & Prins, [24]	L	L	H	L	L	L
Bao et al. [25]	L	L	L	L	L	L
Bediang et al. [26]	H	L	L	L	L	L
Boutilier et al. [27]	L	L	L	L	U	L
Browne et al. [28]	L	L	H	L	L	L
Burzynski et al. [29]	L	L	U	L	L	L
Gashu et al. [30]	H	U	H	L	U	H
Gupta et al. [31]	H	L	H	L	L	H
Johnston et al. [32]	L	L	U	L	L	L
Kibu et al. [33]	L	L	L	L	H	L
Louwagie et al. [34]	L	L	L	L	L	L
Manyazewal et al. [35]	L	L	L	L	L	L
Manyazewal et al. [36]	L	L	L	L	L	L
Nedsuwan et al. [37]	L	U	U	L	L	U
Santra et al. [38]	H	U	U	L	H	H
Wagstaff et al. [39]	L	L	H	L	L	L
Haslinda & Juni [40]	H	L	H	L	H	H

*RSG= Random sequence generation, AC= Allocation Concealment, BPP= Blinding Of Participants and Personnel, BOA= Blinding of Outcome assessment, IOD= Incomplete Outcome Data, SR= Selective Reporting; H= High risk of bias; U= Unclear risk of bias; L= Low risk of bias.

Characteristics of eligible studies

Studies on using m-health applications as innovations to improve adherence, change behaviour, and the success of TB treatment in the last decade have shown a significant increase. We have collected 18 RCT studies from several countries, including Ethiopia (n=3), South Africa (n=2), India (n=2), Cameroon (n=2), US (n=2), and one study each in Thailand, Peru, Sudan, China, Kenya, Canada, and Malaysia. The number of TB patients included in the study ranged from 61 to 1,189, ranging from 18 to 60 years. Most of the studies involved participants newly diagnosed with TB based on positive bacteriology, On DOTS therapy, smears, negative pulmonary tuberculosis (PTB), being prescribed first-line TB drugs, and drug-sensitive pulmonary tuberculosis (PTB). The shortest

duration of intervention given was two months, and the longest was 12 months.

m-Health intervention used

Based on the collected studies, the applications used include Short Messages Service (SMS), Medication Event Reminder Monitor System (MERM), WeChat groups, USSD interface, Wirelessly observed therapy (WOT), Digital Adherence Technologies (DATs), Electronic DOT (live video-conferencing or recorded videos), The CARE-call system, and TB@Clicks (Whatsapp).

Several m-Health collected from eligible studies can be broadly grouped into software and hardware applications. In general, m-health applications that use software provide information as reminders and TB education in writing or pictures. Through the SMS route, various interventions are carried out, starting every day, every two days, twice a week, and every week [24,26,27,31–34,38,39]. Through the We-Chat application, there is no time limit for interactions between patients and supervisors taking medication; at any time, patients can discuss all obstacles and questions with supervisors and fellow patients [25]. As for the Whatsapp application, studies report that in the intensive phase, reminders are given to patients every day and 1 to 3 months after the intervention package is carried out [40]. Through telephone calls, patients are also reminded and controlled by supervisors. The duration of each phone call is 10 minutes [24,38].

The hardware used in the intervention includes the Medication Event Reminder Monitor System (MERM), which is a pillbox dispenser that will sound an alarm at the set time to take medicine [23,35,36]. This model is similar to another system called CARE box; it is just that, in this system, when the lid of the box is opened, it will automatically make a missed call to the server [37]. Another device is Wirelessly Observed Therapy (WOT), a sensory device that enters the body to record what the patient consumes, including TB drugs. The data stored on the sensor is linked to a mobile device as information material for supervisors [28]. For E-DOT, a camera device records real-time video of the patient's medication-taking activities; this system is also used to conduct

video conferencing between supervisors and patients [29].

Effects of m-Health on TB patient adherence

In summary, m-Health, with its various variants, has a positive effect in that patients experience increased adherence and changes in behaviour, even though this is not stated explicitly. Several studies have found a positive effect on treatment success related to patient adherence, with P values of 0.0322 [23,24], 0.88 [26], 0.001 [27], 0.85 [28], 0.1238 [30], 0.782 [31], 0.550 [32], 0.101 [33], 0.443 [34], 0.954 [35], 0.001 [36], 0.675 [37], 0.005 [38], 0.03 [40]. Meanwhile, changes in patient behaviour can be seen in findings such as increased self-management behaviour with a P value <0.001 [25], lower risk of missed doses [31], taking ART medication with an OR value 2.05 [34], return to the clinic with a P value of 0.001 [39].

Comparisons between the intervention and control groups in all studies showed no significant differences. However, the intervention using the m-Health variant showed superiority compared to the control group, most of which were in the main form of standard care, Directly Observation Treatment (DOT).

Using MERM, TB patient adherence to treatment is higher than the DOT standard, where TB patients are 1.15 times more compliant when intervened with MERM than the DOT standard [23]. The patients in the SMS intervention group had a lower failure rate (6.8%; 5 of 74 patients) compared to the control group (10.8%; 8 of 74 patients) [24]. In a study conducted by Bediang and colleagues using m-Health in the form of SMS, treatment success was higher in the intervention group compared to the control group (111 patients: 106 patients) [26]. Using SMS messages daily and an unstructured supplementary services data (USSD) interface shows that the probability of unsuccessful treatment outcomes for individuals in the intervention group is approximately 0.08 less than for individuals in the control group [41]. Browne and colleagues found that WOT was superior to DOT in supporting confirmed daily adherence to TB medications, where (3,738 out of

4,022) prescribed doses were confirmed in the WOT treatment, significantly different ($p < 0.001$) from the 63.1% (1,202 out) of 1,904) of prescribed doses observed in the DOT arm [28]. One hundred seventy-three patients completed the treatment program through the DOT electronic intervention [29]. One hundred ten patients out of a total of 139 TB patients adhered to treatment after intervention using a Mobile phone-based weekly refilling with a daily medication reminder system [30]. Gupta and colleagues found that the treatment success rates in the intervention group using SMS reminders were 86.4%, and the control group was 76.2% [42]. Louwagie and colleagues found that after six months of text SMS intervention, 120 of 133 patients adhered to the TB treatment given [34]. Manyazewal and colleagues using MERM found seven patients completed treatment compared to the control group of 5 [35]. Nedsuwan and colleagues found that using the mobile-based CARE-call system, the number of non-adherence patients in the intervention group was significantly lower than that of the control group (7.5% vs. 27.5%) [37]. Santra and colleagues found that the proportion of participants adherent to DOTS in the intervention group using phone calls and text messages increased from 85.5% at baseline to 96.4% at endline, postintervention [38]. Wagstaff and colleagues found that using SMS messages, as many as 62.0% of patients returned to the clinic in two days compared to 51.5% in the control group [39]. Using the Whatsapp message intervention, Haslinda and Juni found that the number of respondents who adhered to medication was higher in the group that received the intervention (81.8%) compared to the control group (69.1%) [40].

DISCUSSION

This systematic review study aims to evaluate and provide an overview of mHealth RCTs on medication adherence in the patient with tuberculosis which we have successfully conducted by collecting eighteen eligible studies from 2018 to 2022. One of the reasons we limited our literature search to the last five years was to see application innovations that were used along with the

development of the digital world in this period. The expectancy is that the latest technological advances in this digitalization era will make it more straightforward to develop information innovations, especially concerning the health sector, to educate patients and the public.

Since the emergence of digital devices, health practitioners are increasingly competing to take advantage of this progress as a good opportunity to help improve public health in preventive and curative ways. M-Health has been attracting attention since it emerged as an innovation that effectively streamlines interactions between healthcare workers and patients, especially in supervising patients such as TB with strict rules for taking drugs for a certain duration. With a relatively lower cost, m-Health can be the first choice in addition to existing programs for monitoring TB patients. For this reason, this study provides an overview of the effectiveness of the m-Health variant from RCT studies in the 2018 to 2022 period regarding adherence and behaviour changes in TB sufferers during the treatment period. The m-Health variants used in the study are software and hardware. This review study analyzed m-Health variants that were not discussed in several previous systematic reviews [43–46].

The m-Health used in the last Five years

Until the last five years, SMS is still an option to remind TB patients to take their medicine. In contrast to previous review studies [45,46], the effectiveness of SMS in monitoring the treatment of TB patients in this review showed no significant difference between the SMS intervention group and the control group with standard care using DOT. Even using the Whatsapp application, TB patient compliance did not show any significance, even though adherence to treatment in the intervention group was higher than the control group [40]. However, with the widespread use of cellphones with the Android system or iPhone Operating System (iOS) among the public, choosing intervention using SMS or chat remains the best choice considering the low cost and efficient application. In contrast to the findings of Bao and colleagues in China, the We-Chat application

used as an intervention showed a significant increase in adherence and repeat visits to the clinic during a TB treatment program [25]. Besides the effectiveness of existing smartphone-based applications, various obstacles can be faced, especially for populations in remote areas, where cellular networks and even the internet may be inadequate, especially if the quality of the patient's cell phone does not support the use of these applications [47].

Behaviours expected of TB sufferers include not spitting, covering the nose and mouth when coughing or sneezing, and wearing a mask [48]. Of course, TB sufferers expect this behaviour to be carried out as one of the steps to prevent the spread of the disease in the surrounding environment [49]. However, the family should be involved in education on the prevention and care of TB patients. The family has an important role in the patient's treatment process, including preventing the spread of the disease so that it does not affect the people who live in the same house and the people around the house. Families can provide arrangements at home according to good health standards, especially for TB patients. For this reason, further studies need to analyze this educational intervention for families with TB sufferers.

Some of the studies included in this review also provide interventions using a variety of hardware such as the Medication Event Reminder Monitor System (MERM), CARE box, Wirelessly Observed Therapy (WOT), and Electronic-Directly Observation Treatment (E-DOT). These devices are under recommendations from the World Health Organization (WHO) to increase the adherence of TB patients undergoing six months of treatment [14]. Of the six studies that implemented these hardware devices, overall, they showed better success than using software on TB patient adherence to taking medication. The MERM system allows TB patients to take medication daily because the device cover will open at a predetermined time [23]. Manyazewal and the team also used a MERM system with a tool called evriMED500, in the form of a pillbox consisting of a medicine container and an electronic module connected to an indicator light and an alarm [35,36]. The MERM system in the study did not show superiority over the standard care of the control group. However, it should

be recognized that the adherence dimension has many independent variables that may play a large role in influencing interventions. Unfortunately, the study of the use of the MERM system that we found did not carry out an analysis of the potential factors. So that bias in the study is likely to occur.

Another device used is Wirelessly Observed Therapy (WOT), a sensory device that enters the body through the mouth. A patch detector in the torso area will read all sensor activity. The data recorded from the patch detector is transmitted wirelessly via Bluetooth technology to mobile phones, computers, or other gadgets [50]. Browne stated that WOT is very safe to apply without significant side effects, only in the form of minimal irritation due to the direct use of patches on the skin [28]. Statistically, WOT is superior to DOT; in other words, WOT is effective in increasing TB patient adherence to treatment. However, the application of WOT is likely to be constrained, especially in countries with lower middle incomes, because this technology is still relatively expensive, and there are suggestions to replace the patch every five days to avoid irritation [28]. Previous studies have also confirmed that using WOT can increase adherence to antiviral HCV therapy in populations at high risk of non-adherence [51].

Another hardware option we found in one study was the use of e-DOT in real-time or recorded video, depending on patient preference [29]. Real-time video allows patients to interact directly with TB program officers with the help of Skype software. Burzynski and colleagues found that e-DOT is similar to in-person-DOT but has equal effectiveness. For this reason, e-DOT can be applied according to the patient's choice. Especially during a pandemic such as COVID-19, electronic DOT is the best choice to reduce the spread and worsen TB patients' conditions, as found by Lippincott and colleagues in implementing the Vdot COVID-19 pandemic where this method has high effectiveness and is the first choice. In contrast, in-person DOT is recommended to be carried out later [52]. Haberer and Subbaraman added that implementing eDOT might encounter technical challenges, inaccuracies, costs, and an unsupportive health system [47].

The potential of mHealth on TB patient adherence

Compliance of TB patients with the treatment program can be seen from the success of the treatment. Of the various types of mHealth that we collected, almost all showed an increase in adherence of TB sufferers to the treatment given. Although, comparison with the control group mostly showed insignificant differences.

The use of SMS text generally shows more potential than the DOT standard. Two studies show that compliance with TB patients using SMS text interventions is similar to DOT standards [32,33]. The study states that there may be several factors that influence the failure of TB patient compliance even though they have been reminded via SMS messages, including the lack of more personalized engagement, the didactic nature of the messages, and the SMS message is received when the patient was not near his/her medication all contributed to the failure to reduce poor adherence [53]. For this reason, in the future, this can be a consideration in implementing interventions using text SMS, where controlling these situations is essential to consider. However, based on the success of increasing adherence from studies using text SMS, it was stated that patient compliance was one time greater than the DOT standard. The same thing was also found in the use of Whatsapp, where significant treatment success occurred in TB patients who were given education through messages via Whatsapp [40].

The medication event reminder monitor (MERM) system in studies using it also shows positive potential to improve TB patient adherence to treatment. In addition, using MERM can also reduce the workload of health workers [54]. One problem identified using MERM is the possibility of removal of the medication from the pillbox, for example, for work-related reasons, which prevents the recording of pill dispensing. Although the potential of MERM is not superior to in-person DOT, MERM can be used as an alternative to improve TB patient compliance. The identical thing is also found in using electronic DOT and WOT. This hardware allows stricter supervision and accurate recording of each drug-taking activity so that health workers can more easily measure treatment

success.

LIMITATION

The limitations encountered in this review include limited access to several reputable databases, which does not allow us to explore further relevant articles. In addition, this review includes studies of low to high quality due to the small number of articles we have collected. For this reason, writers who want to use the results of this review must be careful and analyze them more carefully.

CONCLUSION

This review shows that using m-Health can be the first choice in handling TB cases with the DOT strategy. Hardware as part of mHealth has more potential to increase TB patient adherence and behaviour change. TB patient compliance with medication programs and stopping the spread of TB through good behaviour will be very significant in reducing TB cases, recurrent cases and new cases. mHealth is the best choice as a companion to the ongoing DOT program, primarily as a medium for disseminating information needed by patients during their treatment period. In the era of digitalization today and in the future, mHealth is undoubtedly the main route in health services, as illustrated during the pandemic of certain diseases that did not allow face-to-face meetings. However, further efficacy studies at the clinical level are needed, while always protecting privacy.

REFERENCES

1. Acharya B, Acharya A, Gautam S, Ghimire SP, Mishra G, Parajuli N, et al. Advances in diagnosis of Tuberculosis: an update into molecular diagnosis of Mycobacterium tuberculosis. *Molecular biology reports*. 2020;47:4065–75.
2. Asriati A, Kusnan, Adius, Alifariki L. Faktor Risiko Efek Samping Obat dan Merasa Sehat Terhadap Ketidakpatuhan Pengobatan Penderita Tuberkulosis Paru. *JURNAL KESEHATAN PERINTIS (Perintis's Health Journal)*. 2019;6(2):134–9.
3. Putri S, Alifariki LO, Fitriani F, Mubarak M. The Role of Medication Observer And Compliance In Medication Of Pulmonary Tuberculosis Patient. *Jurnal Kesehatan Prima* [Internet]. 2020 Feb 29;14(1). Available from: <http://jkp.poltekkes-mataram.ac.id/index.php/home/article/view/248>
4. World Health Organization (WHO). Tuberculosis [Internet]. 27 October 2022. 2022. Available from: <https://www.who.int/news-room/fact-sheets/detail/tuberculosis>
5. Harding E. WHO global progress report on tuberculosis elimination. *The Lancet Respiratory Medicine*. 2020;8(1):19.
6. Dean AS, Auguet OT, Glaziou P, Zignol M, Ismail N, Kasaeva T, et al. 25 years of surveillance of drug-resistant tuberculosis: achievements, challenges, and way forward. *The Lancet Infectious Diseases*. 2022;
7. Ghozali MT, Murani CT. Relationship between knowledge and medication adherence among patients with tuberculosis: a cross-sectional survey. *Bali Medical Journal*. 2023;12(1):158–63.
8. Asriati A. Faktor Risiko Ketidakpatuhan Pengobatan Penderita Tuberkulosis Paru di Kota Kendari. *Jurnal Keperawatan Terapan (e-Journal)*. 2019;5(2):103–10.
9. World Health Organization. Digital health for the End TB Strategy: an agenda for action. World Health Organization; 2015.

10. El Emeiry F, Shalaby S, El-Magd GHA, Madi M. Treatment outcomes of tuberculosis among new smear-positive and retreatment cases: a retrospective study in two Egyptian governorates. *The Egyptian Journal of Chest Diseases and Tuberculosis*. 2019;68(3):274.
11. Ying R, Huang X, Gao Y, Wang J, Liu Y, Sha W, et al. In vitro Synergism of Six Antituberculosis Agents Against Drug-Resistant *Mycobacterium tuberculosis* Isolated from Retreatment Tuberculosis Patients. *Infection and Drug Resistance*. 2021;3729–36.
12. Margineanu I, Louka C, Vincenti-Gonzalez M, Saktiawati AMI, Schierle J, Abass KM, et al. Patients and medical staff attitudes toward the future inclusion of ehealth in tuberculosis management: perspectives from six countries evaluated using a qualitative framework. *JMIR mHealth and uHealth*. 2020;8(11):e18156.
13. Zhang J, Yang Y, Qiao X, Wang L, Bai J, Yangchen T, et al. Factors influencing medication nonadherence to pulmonary tuberculosis treatment in tibet, china: a qualitative study from the patient perspective. *Patient preference and adherence*. 2020;1149–58.
14. World Health Organization. Handbook for the use of digital technologies to support tuberculosis medication adherence. World Health Organization; 2017.
15. Hamine S, Gerth-Guyette E, Faulx D, Green BB, Ginsburg AS. Impact of mHealth chronic disease management on treatment adherence and patient outcomes: a systematic review. *Journal of medical Internet research*. 2015;17(2):e52.
16. Bartels SL, Van Knippenberg RJM, Dassen FCM, Asaba E, Patomella A-H, Malinowsky C, et al. A narrative synthesis systematic review of digital self-monitoring interventions for middle-aged and older adults. *Internet interventions*. 2019;18:100283.
17. He Q, Zhao X, Wang Y, Xie Q, Cheng L. Effectiveness of smartphone application-based self-management interventions in patients with type 2 diabetes: A systematic review and meta-analysis of randomized controlled trials. *Journal of advanced nursing*. 2022;78(2):348–62.

18. Zhu MM, Choy BNK, Lam WWT, Shum J. Randomized control trial of the impact of Patient Decision Aid (PDA) developed for Chinese primary open-angle glaucoma patients. *Ophthalmic Research*. 2023;
19. Hirsch-Moverman Y, Daftary A, Yuengling KA, Saito S, Ntoane M, Frederix K, et al. Using mHealth for HIV/TB treatment support in Lesotho: enhancing patient-provider communication in the START study. *Journal of acquired immune deficiency syndromes (1999)*. 2017;74(Suppl 1):S37.
20. Mohammed S, Glennerster R, Khan AJ. Impact of a daily SMS medication reminder system on tuberculosis treatment outcomes: a randomized controlled trial. *PloS one*. 2016;11(11):e0162944.
21. Farooqi RJ, Ahmed H, Ashraf S, Zaman M, Farooq S, Farooqi JI. Feasibility and acceptability of Mobile SMS reminders as a Strategy to improve drugs adherence in TB Patients. *Pakistan Journal of Chest Medicine*. 2017;23(3):93–100.
22. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *International Journal of Surgery*. 2021;88:105906.
23. Acosta J, Flores P, Alarcon M, Grande-Ortiz M, Moreno-Exebio L, Puyen ZM. A randomised controlled trial to evaluate a medication monitoring system for TB treatment. *The International Journal of Tuberculosis and Lung Disease*. 2022;26(1):44–9.
24. Ali AOA, Prins MH. Mobile health to improve adherence to tuberculosis treatment in Khartoum state, Sudan. *Journal of Public Health in Africa*. 2019;10(2).
25. Bao Y, Wang C, Xu H, Lai Y, Yan Y, Ma Y, et al. Effects of an mHealth intervention for pulmonary tuberculosis self-management based on the integrated theory of health behavior change: randomized controlled trial. *JMIR public health and surveillance*. 2022;8(7):e34277.
26. Bediang G, Stoll B, Elia N, Abena J-L, Geissbuhler A. SMS reminders to improve adherence

- and cure of tuberculosis patients in Cameroon (TB-SMS Cameroon): a randomised controlled trial. BMC public health. 2018;18:1–14.
27. Boutilier JJ, Yoeli E, Rathauer J, Owiti P, Subbaraman R, Jónasson JO. Can digital adherence technologies reduce inequity in tuberculosis treatment success? Evidence from a randomised controlled trial. BMJ Global Health. 2022;7(12):e010512.
28. Browne SH, Umlauf A, Tucker AJ, Low J, Moser K, Gonzalez Garcia J, et al. Wirelessly observed therapy compared to directly observed therapy to confirm and support tuberculosis treatment adherence: a randomized controlled trial. PLoS medicine. 2019;16(10):e1002891.
29. Burzynski J, Mangan JM, Lam CK, Macaraig M, Salerno MM, deCastro BR, et al. In-person vs electronic directly observed therapy for tuberculosis treatment adherence: A randomized noninferiority trial. JAMA Network Open. 2022;5(1):e2144210–e2144210.
30. Gashu KD, Gelaye KA, Lester R, Tilahun B. Effect of a phone reminder system on patient-centered tuberculosis treatment adherence among adults in Northwest Ethiopia: a randomised controlled trial. BMJ Health & Care Informatics. 2021;28(1).
31. Gupta A, Bhardwaj AK, Singh H, Kumar S, Gupta R. Effect of ‘mHealth’ Interventions on adherence to treatment and outcomes in Tuberculosis patients of district Shimla, Himachal Pradesh, India: A Randomised Control Trial. Indian Journal of Preventive & Social Medicine. 2020;51(3):125–36.
32. Johnston JC, van der Kop ML, Smillie K, Ogilvie G, Marra F, Sadatsafavi M, et al. The effect of text messaging on latent tuberculosis treatment adherence: a randomised controlled trial. European Respiratory Journal. 2018;51(2).
33. Kibu OD, Siysi VV, Albert Legrand SE, Asangbeng Tanue E, Nsagha DS. Treatment Adherence among HIV and TB Patients Using Single and Double Way Mobile Phone Text Messages: A Randomized Controlled Trial. Journal of Tropical Medicine. 2022;2022.
34. Louwagie G, Kanaan M, Morojele NK, Van Zyl A, Moriarty AS, Li J, et al. Effect of a brief

- motivational interview and text message intervention targeting tobacco smoking, alcohol use and medication adherence to improve tuberculosis treatment outcomes in adult patients with tuberculosis: a multicentre, randomised controlled tri. *BMJ open*. 2022;12(2):e056496.
35. Manyazewal T, Woldeamanuel Y, Holland DP, Fekadu A, Marconi VC. Effectiveness of a digital medication event reminder and monitor device for patients with tuberculosis (SELFTB): a multicenter randomized controlled trial. *BMC medicine*. 2022;20(1):310.
 36. Manyazewal T, Woldeamanuel Y, Getinet T, Hoover A, Bobosha K, Fuad O, et al. Patient-reported usability and satisfaction with electronic medication event reminder and monitor device for tuberculosis: a multicentre, randomised controlled trial. *eClinicalMedicine*. 2023;56:101820.
 37. Ratchakit-Nedsuwan R, Nedsuwan S, Sawadna V, Chaayasirinroje B, Bupachat S, Ngamwithayapong-Yanai J, et al. Ensuring tuberculosis treatment adherence with a mobile-based CARE-call system in Thailand: a pilot study. *Infectious Diseases*. 2020;52(2):121–9.
 38. Santra S, Garg S, Basu S, Sharma N, Singh MM, Khanna A. The effect of a mhealth intervention on anti-tuberculosis medication adherence in Delhi, India: A quasi-experimental study. *Indian Journal of Public Health*. 2021;65(1):34.
 39. Wagstaff A, Van Doorslaer E, Burger R. SMS nudges as a tool to reduce tuberculosis treatment delay and pretreatment loss to follow-up. A randomized controlled trial. *PLoS One*. 2019;14(6):e0218527.
 40. Haslinda N, Juni MH. Effectiveness of health education module delivered through Whatsapp to enhance treatment adherence and successful outcome of tuberculosis in Seremban district, Negeri Sembilan, Malaysia. *International Journal of Public Health and Clinical Sciences*. 2019;6(4):145–59.
 41. Boutilier JJ, Jónasson JO, Yoeli E. Improving tuberculosis treatment adherence support: the case for targeted behavioral interventions. *Manufacturing & Service Operations*

- Management. 2022;24(6):2925–43.
42. Das Gupta D, Patel A, Saxena D, Koizumi N, Trivedi P, Patel K, et al. Choice-Based Reminder Cues: Findings From an mHealth Study to Improve Tuberculosis (TB) Treatment Adherence Among the Urban Poor in India. *World Medical & Health Policy*. 2020;12(2):163–81.
43. Laksono EB, Johan A, Erawati M. The Utilization of Mobile-Health Intervention In Improving Treatment Compliance Behavior In Tuberculosis Patients. *Nurse and Health: Jurnal Keperawatan*. 2022;11(2):275–86.
44. Shariful IM. Theories applied to m-health interventions for behavior change in low-and middle-income countries: a systematic review. *Telemedicine and e-Health*. 2018;
45. Nglazi MD, Bekker L-G, Wood R, Hussey GD, Wiysonge CS. Mobile phone text messaging for promoting adherence to anti-tuberculosis treatment: a systematic review. *BMC infectious diseases*. 2013;13(1):1–16.
46. Sarabi RE, Sadoughi F, Orak RJ, Bahaadinbeigy K. The effectiveness of mobile phone text messaging in improving medication adherence for patients with chronic diseases: a systematic review. *Iranian Red Crescent Medical Journal*. 2016;18(5).
47. Haberer JE, Subbaraman R. Digital technology for tuberculosis medication adherence: promise and peril. Vol. 17, *Annals of the American Thoracic Society*. American Thoracic Society; 2020. p. 421–3.
48. Lucya V. Prevention of Tuberculosis: Literature Review. *KnE Life Sciences*. 2021;630–4.
49. Lönnroth K, Roglic G, Harries AD. Improving tuberculosis prevention and care through addressing the global diabetes epidemic: from evidence to policy and practice. *The lancet Diabetes & endocrinology*. 2014;2(9):730–9.
50. Hafezi H, Robertson TL, Moon GD, Au-Yeung K-Y, Zdeblick MJ, Savage GM. An ingestible sensor for measuring medication adherence. *IEEE Transactions on Biomedical Engineering*.

- 2014;62(1):99–109.
51. Bonacini M, Kim Y, Pitney C, McKoin L, Tran M, Landis C. Wirelessly observed therapy to optimize adherence and target interventions for oral hepatitis C treatment: observational pilot study. *Journal of Medical Internet Research*. 2020;22(4):e15532.
 52. Lippincott CK, Perry A, Munk E, Maltas G, Shah M. Tuberculosis treatment adherence in the era of COVID-19. *BMC infectious diseases*. 2022;22(1):800.
 53. Liu X, Lewis JJ, Zhang H, Lu W, Zhang S, Zheng G, et al. Effectiveness of electronic reminders to improve medication adherence in tuberculosis patients: a cluster-randomised trial. *PLoS medicine*. 2015;12(9):e1001876.
 54. Wang N, Zhang H, Zhou Y, Jiang H, Dai B, Sun M, et al. Using electronic medication monitoring to guide differential management of tuberculosis patients at the community level in China. *BMC infectious diseases*. 2019;19(1):1–9.

MUSIC THERAPY FOR PAIN AND ANXIETY IN HOSPITALIZED CHILDREN: A SYSTEMATIC REVIEW OF RANDOMIZED CONTROLLED TRIAL

Arvida Bar¹, Monalisa^{2*}, Netha Damayantie³, Halimah⁴

^{1,2,3,4}Department of Nursing, Health Polytecnic of Jambi, Indonesia

* *Corresponding author*: Monalisa, Jl. Dr. Tazar, Buluran Kenali, Kec. Telanaipura, Kota Jambi, Jambi 36361, Indonesia, Orcid: <https://orcid.org/0000-0002-4879-3893>

Email: monalisa.poltekkes@gmail.com

Phone: +62 821-8656-3003

Review article

DOI: [10.32549/OPI-NSC-92](https://doi.org/10.32549/OPI-NSC-92)

Submitted: 09 April 2023

Revised: 27 April 2023

Accepted: 06 May 2023

Published online: 17 May 2023

This article is licensed under the Creative Commons Attribution - Non Commercial - No Derivatives 4.0 (CC BY NC ND 4.0) international license.

ABSTRACT

Introduction. Music has been widely recognized for its effectiveness in controlling anxiety and pain. However, in particular groups such as children, the implementation may be challenging, especially regarding the type of music selection. The aim of the study is to evaluate the music therapy efficacy on pain and anxiety management in pediatric care to improve the management of pain and anxiety in the pediatric population.

Methods. This review was written according to the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) statement. In assessing the impact of music therapy as a method of pain and anxiety management in pediatric care, a database tracking was conducted for articles publicized between 2000 and 2022. The databases used including Sciencedirect, Cochrane library, PubMed, and Wiley online library. Articles were deemed if the study subjects ranged in age from 0 to 21 years old, the intervention was live or recorded music, and the study took place in an inpatient background.

Results. 1,129 publications were discovered. In final search of literature, there are 12 articles included in this review. There is consistent and consequential evidence that music may relieve pain and anxiety in hospitalized children before and during procedures. The type of music that is widely used is classical and traditional instrumental music. In addition, there were only two studies using nursery rhymes.

Conclusion. The patient's preference in choosing music for children enables them to determine the appropriateness of therapy. Classical music can be the main choice in applying music therapy in reducing anxiety and pain in children.

Keywords: Pediatric, music; pain; anxiety; inpatient; nurse

INTRODUCTION

Extreme anxiety may harm a child's physical and psychological health, cause adverse postoperative outcomes that hinder recuperation, rehabilitation and reduce a child's alliance in self-care [1–3]. Hospitalized children may experience anxiety due to daily activities, recurring convulsions, loss of control, or loneliness [4–6]. According to the current study, compelling pain and anxiety management are critical to healing [7,8]. Untreated pain and anxiety may cause diverted recovery, extended hospitalization, impaired physical growth and development, faked personality, and a lifelong nervousness of medical providers and treatments to be inducted [6,9–12].

There are multiple hindrances to implementing sufficient management of child care. Many parents and healthcare providers fear the side effects of pain and anxiety remedies [13–16]. Since 1999, the U.S. pediatric mortality rate, ages 0 to 19, has nearly tripled due to illicit prescription opioids [18]. Due to the risks and harmful effects of sole reliance on pharmacological treatments, Governments and healthcare providers are striving for alternative non-pharmacological modalities for manipulating pain and anxiety, particularly in children [19].

Music, touch, and nurse-led distraction techniques are non-pharmacological therapies currently widely used in pediatric care [20]. This therapy is effective in helping reduce the dose and duration of pain and anxiety medications and improve pain and anxiety scores; thus, nurses can continue to maintain their autonomy [21,22]. Focusing on music therapy turns out that this therapy has the potential to reduce or even eliminate the need for pharmacological therapy (18). Music also impacts human emotional and physiological responses by diverting attention from the symptoms of pain and anxiety that arise (19). The theory best known as the mechanism of pain, Gate Control, posits that pain receptors collaborate to transmit pain signals to the brain [23]; thus, distractions such as music can block specific pain pathways and reduce the amount of pain felt. Music therapy sessions allow individuals to express their pain and anxiety in healthy ways, such as through improvised songs and playing instruments [24,25]. Music has been used in clinical settings such as general practice

(medical and dental) and more specialized settings such as surgery and related medical professions (such as physiotherapy and speech therapy). It is essential to recognize differences between the clinical practice of music therapists, who are certified, and the use of music by lay practitioners, who are not explicitly trained or have some background in music psychology or clinical psychology [26,27].

Previous systematic reviews of randomized controlled trial studies concluded the excellent efficacy of music therapy for children in controlling pain and anxiety when facing medical procedures. However, these studies could have clearly shown the type of music and therapy delivery method, which is still a big question [28]. Another review study found that the evidence for the effectiveness of using music to reduce dental anxiety in children is inconclusive and of limited quality [27]. The present review study aims to assess the effect of music therapy on pain and anxiety management in pediatric care to improve pain and anxiety management in the pediatric population from existing literature published from 2000 to 2022. The time-lapse chosen to updating studies in previous review. Review question including what types of music most used? What method used to deliver the music?

METHODS

Review Protocol

Following the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) 2020 guidelines, we conducted a systematic review of the literature consisting of Randomized Controlled Trials (RCTs) that appraised the effectiveness of music therapy in alleviating pain and anxiety in pediatric care [29].

Eligibility Criteria

We removed duplicates and uploaded articles to the web-based bibliography and database manager.

It was then distributed to the team members, and a single reviewer initially reviewed the title and abstract. The following step was a full-text review by two reviewers. Additional reviewers were organized to deal with contentions to reach a consensus. The inclusion criteria include subjects ranged in age from 0 to 21, using live or recorded music in a hospital setting, effective or ineffective in alleviating pain and anxiety, and the full text was available in English. Articles are excluded if located in an outpatient setting, such as an emergency department or venipuncture clinic; music therapy by a music therapist; in labour or involving pregnant adolescents; during surgery or under general anaesthesia, or occurs in the neonatal intensive care unit (NICU) or pediatric intensive care unit (PICU). Babies treated in the NICU must be excluded because premature babies' nervous systems are immature, so they respond to pain differently from full-term babies. Although not all babies treated in the NICU are premature, several articles do not always distinguish between premature and full-term babies born in the NICU. Theses or dissertations, conference articles, comments, editorial reports, and poster presentations are exempt.

Elements	Statement
Population	Children in Pediatric care
Intervention	Music or audio provided using any equipment
Comparison	With or without any treatment or therapy
Outcomes	Reduction in pain or/and anxiety scale
Study design	Experimental study

Table 1. *PICOS statement*

Information source

A medical librarian searched a database for articles published in the previous ten years, from 2000 to 2022, in May 2022. Scencedirect, Cochrane library, PubMed, and Wiley online library were all searched.

Search Strategy

PubMed, Sciencedirect, Wiley Online Library, and the Cochrane Library were among the databases searched. Furthermore, we also search on the list of references in the article that meet the criteria to broaden the search results further. In creating a comprehensive search strategy for each database, the following search terms were used: (1) pediatric, child, adolescent, infant, infant, toddler, adolescent, adolescent, male, female, (2) pain, tone, voice (3) anxiety (4) hospitalization, hospitalization, procedure, postoperative, surgery. A review of all included study references was also conducted. We also add filters to each database, including publication type and research design.

Databases	Keywords
Sciencedirect	Child OR Children OR Toddler AND Music OR Music therapy OR Voice AND Pain OR Aching OR Anxiety
Cochrane library	Child OR Children OR Toddler AND Music OR Music therapy OR Voice AND Pain OR Aching OR Anxiety
PubMed	(((((("child"[MeSH Terms]) OR ("pediatric nursing"[MeSH Terms])) OR ("toddler"[Title/Abstract])) OR ("children"[Title/Abstract])) AND (((("music"[MeSH Terms]) OR ("music therapy"[MeSH Terms])) OR ("voice/therapy"[MeSH Terms])) OR ("tone therapy"[Title/Abstract])))) AND (("pain"[MeSH Terms]) OR ("anxiety"[MeSH Terms]))
Wiley online library	Child OR Children OR Toddler AND Music OR Music therapy OR Voice AND Pain OR Aching OR Anxiety

Table 2. *Search String*

Data Collection

Two authors independently screened the title and abstract to suit the inclusion criteria, if it was not clear, then they continued by reading the main text. No automation tools were used in selection

literatures.

Data Extraction

To extract the required data, we followed the McMaster Critical Review Form-Quantitative Studies v. 2.0 and added some information that we think is important. The data we extracted included authors, countries, outcomes, study designs, participants, interventions, evaluation methods, and main findings. Two authors performed data extraction independently. The finalization of the extraction process was read and endorsed by the first author.

Quality of the Study

Study quality was assessed by two authors independently using the Critical Appraisal Skills Program (CASP) for the Randomized Controlled Trial [30]. This tool consists of 11 questions which are divided into four sections with the choices of Yes, No, and Can't Tell checklist columns. We categorize the quality of studies into High, Medium, and Low. High quality studies if you have answers YES 10 – 11/11, medium quality if you have answers YES 7 – 9/11, and Low quality if answers YES $\leq 6/11$.

Study Risk of Bias Assessment

The risk of bias or validity in the process and results of a systematic review is reflected in its methodological quality. The Cochrane Handbook 5.2.0 was used to reckon methodological quality. Two authors independently assessed the risk of bias in the included studies. In the circumstance of a disagreement, refer it to the corresponding author for arbitration. The Cochrane bias risk assessment tool was used to evaluate the risk of RCTs, which possessed random sequence generation, allocation concealment, blinding of subjects and researchers, blinding of outcome assessment, insufficient outcome data, and selective reporting.

RESULTS

Study Selection

A systematic electronic search identified that 1,129 publications were discovered through backward searching of relevant papers. The full-text screening was conducted on 783 articles. A total of 692 articles failed to meet eligibility criteria at the full-text screening stage, and only 12 articles were finally eligible for further analysis. The search results follow the PRISMA 2020 flow diagram (Fig. 1).

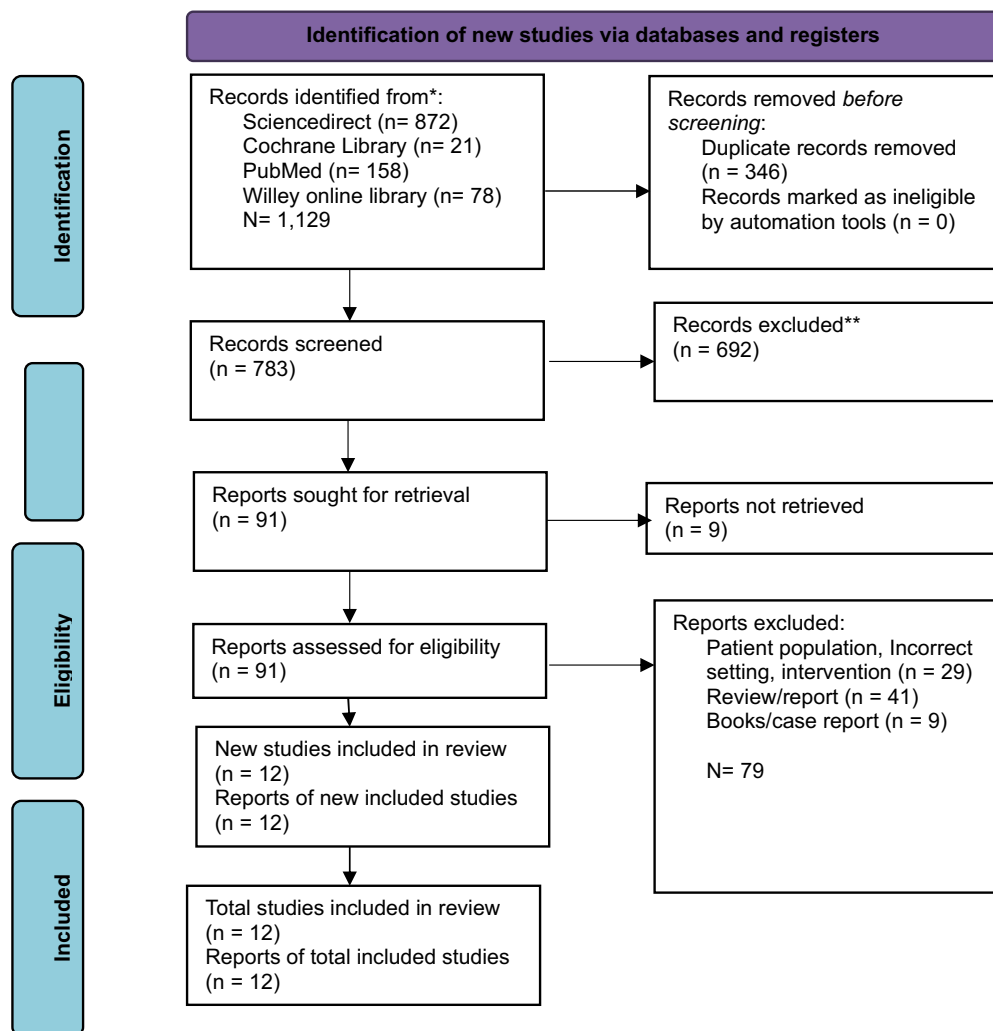


Figure 1. PRISMA flow diagram for literature search

Author, Year, country	Study Design	Participants	Intervention	Evaluation tools	Effect on anxiety	Effect on pain
Noguchi, 2006, US	RCT	n= 62 Ages 4 – 6yo	‘Little squirrel’ song using headphones for 1 minute and 56 seconds before, during, and after injection	OSBD, The faces pain scale	OSBD score 4.64 (p>.05)	Pain score 3.39 (p<.01)
Kim et al., 2010, South Korea	RCT	n = 23 Age 22mo–14yo	Mothers voice using headphones ≥30 min pre-post operative	mYPAS	Significantly attenuated (P=0.001)	-
Balan et al., 2009, India	RCT	n =50 Ages 5-20yo	Indian instrumental classical music using earphone before, during, and after venipuncture ≥20 min	Using VAS 5 min after the insertion	-	Reduction in VAS pain scores during procedure
Liu & Petrini, 2015, China	RCT	n=112 Age >18yo	Soft music with 60–80 beats per minute using earphone for 30 min post operative for 3 days	Faces pain scale, STAI immediately after the therapy	Significant reduction in STAI score (P=0.020)	Significant reduction in faces pain scale score (p=0.019)
Yu et al., 2009, China	RCT	n = 30 Ages 2–12yo	Children's songs using headphones for 30 min during acupuncture	mYPAS, CHEOPS, WB-FACES at 1 min, and at 30 min after intervention	Significant reduction in m-YPAS anxiety scores after acupuncture (p < .05)	No significant reduction in CHEOPS and FACES pain scores during or after acupuncture
Nguyen et al., 2010, Vietnam	RCT	n = 20 Ages 7–12yo	Traditional Vietnamese using headphones 10 min prior to and throughout LP (18–27 min)	STAI, The NRS	Significant reduction in STAI anxiety scores before LP (p < .001)	Significant reduction in NRS pain scores during(p < .001) and after (p < .003) LP
Franzoi et al., 2016, Brazil	RCT	n = 26 Age 3–12yo	Instrumental using headphones for 15 min pre-operative	mYPAS	Significant reduction in m-YPAS anxiety scores(p = .0441) pre-operatively	-
Sabzevari et al., 2017, Iran	RCT	n= 100 7 – 14yo	Classical Music using speakers (pair) after endoscopy	Baker - Wong pain scale	-	Significant reduction in Wong-Baker face score (P<0.000)
Longhi et al., 2015, UK	Quasi-experimental	n=37 Ages 7days–4yo	Lullabies through ambient for 10 min during	CHEOPS	-	Significant reduction in CHEOPS pain

			hospitalization			scores (p = .003)
Kazemi et al., 2012, Iran	RCT	n=30 Age 9–12yo	Instrumental using headphones for 20 min during hospitalization	STAIC	Significant reduction in STAIC anxiety scores (p< .05) during hospitalization	-
Bulut et al., 2020, Turkey	RCT	n=35 Age 7-11 yo	Classical music using the Creatone music pillow for 20 minutes, 1 hour after being taken to the unit from the children's PACU	WB-FACES, mYPAS	Significant reduction in m-YPAS anxiety scores(p < .05)	Significant reduction in WB FACES score (P<.05)
Suresh et al., 2015, USA	RCT	n=18 Ages 6–18yo	Music listed in iPod using headphones for 30 min	FPS-R before and 30 min after treatment within 48 h after surgery	-	Reduction in FACES pain scores and pain burden post-operatively, but not statistically significant

*mo=month; yo=years old; OSBD= *Observational Scale of Behavioral Distress*; VAS= *visual analogue scale*; mYPAS= *modified Yale pre-operative anxiety scale*; CHEOPS= *Children's Hospital of Eastern Ontario Pain Scale*; STAI= *state-trait anxiety inventory*; STAIC= *Spielberger State-Trait Anxiety Inventory*; WB-FACES= *Wong-Baker FACES*; FPS-R= *Faces Pain Scale-Revised*; NRS= *Numeric Rating Scale*; PACU= *Post anesthesia care unit*

Table 3. *Characteristics of studies included.*

Study Characteristics

Eleven randomized controlled trials (RCTs) and one quasi-experimental study met the inclusion criteria and was analyzed. The studies included 543 participants ranging in age from seven days to 18 years. The research was conducted in eight countries: India (8.33%, n=1) [31], Brazil (8.33%, n=1) [32], Iran (16.67%, n=2) [33,34], South Korea (8.33%, n=1) [35], the United Kingdom (UK) (8.33%, n=1) [36], Vietnam (8.33%, n=1) [37], the United States (US) (16.67%, n=2) [38,39], Turkey (8.33%, n=1) [25], and China (16.67%, n=2) [40,41].

Studies reported the implementation of music therapy before a procedure (n =5, 41.67%), during a procedure (n =4, 33.33%), after a procedure (n =6, 50%), or at any time during a hospitalization (n

=2 16.67%), music-based interventions were used. The time spent listening to music ranged from 1 minute to at least 30 minutes. Most of the studies (n=7, 58.3%) used recorded music with headphones (n=7, 58.3%); one used speakers and ambient music.

The studies in the analysis scrutinized the effects of music-based interventions on pain (n=5, 41.67%) and anxiety (n=5, 41.67%). Some studies found a consequential lowering in pain scores in the music group (n=3), while others found no significant reduction (n=2). Before and during procedures, all studies conveyed a significant reduction in anxiety scores in the music group (n=5). Only one study discovered no significant lessening in anxiety scores in the music group following surgery.

Study quality

Based on the results of the study quality assessment which consisted of thirteen questions, only four studies were in the High Quality category, and eight other studies were in the Medium Quality category.

Authors	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13
Noguchi, 2006	Y	N	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y
Kim et al., 2010	Y	N	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y
Balan et al., 2009	Y	Y	Y	N	N	N	Y	Y	N	N	Y	Y	Y
Liu & Petrini, 2015	Y	N	Y	N	N	N	N	Y	Y	Y	Y	Y	Y
Yu et al., 2009	Y	N	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y
Nguyen et al., 2010	Y	Y	Y	N	N	N	Y	Y	N	Y	Y	Y	Y
Franzoi et al., 2016	Y	N	Y	N	N	N	N	Y	Y	Y	Y	Y	Y
Sabzevari et al., 2017	Y	Y	Y	N	Y	N	Y	Y	N	N	Y	Y	Y
Longhi et al., 2015	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y
Kazemi et al., 2012	Y	N	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y
Bulut et al., 2020	Y	Y	Y	N	Y	N	N	Y	Y	Y	Y	Y	Y
Suresh et al., 2015	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y

Table 4. *Summary of quality assessment*

Risk of Bias in Studies

Based on the bias assessment, all studies are in the low category in the Bias in measurement of the outcome domain. For overall bias, there are four studies that are in the Some Concerns category, and eight studies that are in the Low risk of bias category.

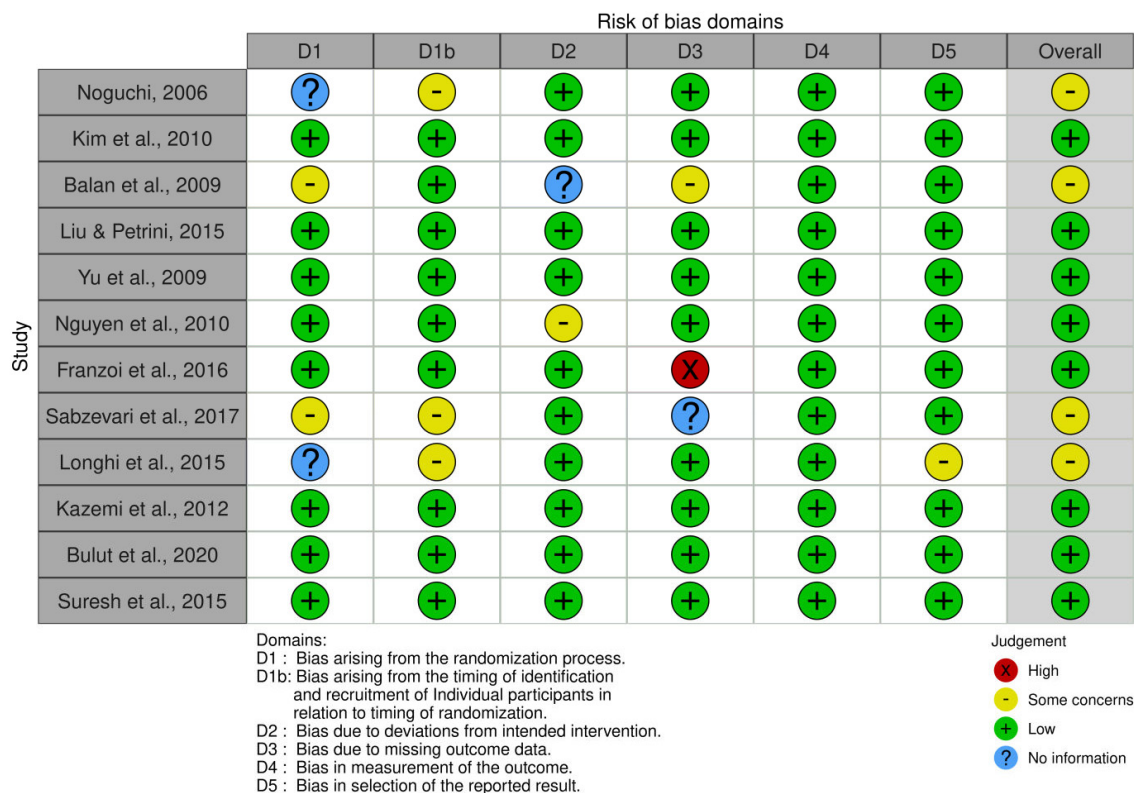


Figure 2. Traffic-light plot for RoB in individual study

Effect on Anxiety

There are eight studies [25,32,34,35,37,38,40] who analyzed the effect of music on pediatric anxiety in dealing with hospital care situations. The measurements of participants' anxiety levels used a variety of instruments, including The Observational Scale of Behavioral Distress (OSBD), the modified Yale Preoperative Anxiety Scale (mYPAS), and The Spielberger State-Trait Anxiety

Inventory (STAIC). Overall there was a significant decrease in anxiety in the studies that analyzed the effects of this music intervention.

Effect on Pain

There are nine studies [25,31,33,36–41] who analyzed the effect of music on the level of pain experienced by pediatricians. However, two studies showed insignificant results in reducing experienced pain [31,41]. The instruments used to measure pain include Wong-Baker Faces (WB-FACES), Visual Analog Scale (VAS), Numeric rating scale (NRS), and The Children's Hospital of Eastern Ontario Pain Scale (CHEOPS).

DISCUSSION

Non-pharmacologic methods are widely used as forms of pain, fear, and vomiting control for children in the hospital setting. There are several medical procedures in the hospital that can provide an unpleasant experience, especially in Pediatric care. This review evaluated the impact of music therapy as a corroborative strategy for pain and anxiety control in hospitalized children. The publications' central theme was statistically meaningful evidence that music can decline anxiety before and during procedures [32,34,35,37,38,40,41]. However, results concerning pain, often viewed as physiologic analogs to pain, were mixed [31,32,36–39,41]. Music-based interventions are also secure for hospitalized children, according to the evidence. Only one RCT reported any negative effects, deemed minor and mostly related to headphone affliction or no refinement in pain or anxiety scores [37].

It is crucial to explore patient factors that contributed to music interventions' success in employing this review's findings. Several studies have emphasized the importance of patient discretion in deciding on music for children [32,37,39,41]. Researchers have allowed two-year-olds to choose the type of music they want to listen to in several research studies [37,39,41]. According to one study,

this sovereignty contributed to lower pain and anxiety levels in music groups [37]. In another study, subjects were reluctant to listen to researcher-selected music, resulting in significant sample loss [32]. It reflects a broader healthcare shift towards patient-centered care over the past decades, recognizing the importance of patient preferences in achieving positive health outcomes[24]. Music-based interventions deliver tangible ways for children to partake directly in care giving and manage challenging situations.

It is also important to regard the kit for implementing musical interventions. There is a high reliance on pre-recorded audio delivered through headphones. It exemplifies the viability and cost-effectiveness of music interventions in the hospital. The costs associated with the equipment needed to play music are relatively affordable, and several previous studies suggest that nurses may execute interventions without formal internship [32,35,37,39,41].

Music treatment is unassailable, affordable, and uncomplicated to learn, and hospital nurses can use it efficiently [42]. Music in nursing practice can be used unattended or in concurrence with other methods, such as jaw relaxation [43] and therapist guidance [44]; it can be used in a variety of sets, circumstances, and people for a miscellany of pursuits [43–47]. According to studies, 20-90 minutes of music therapy is an adequate remedy time. The following types of music were played: Sedative music [48], researcher-supplied music and subject-preferred music, smoothing music, and easy-listening music are all examples of sedative [46].

Music therapy may activate the natural analgesia in the human body that leads to alleviating pain, known as Endorphine [49]. Endorphine is a neuro hormone provoking pleasant sensations. The pain will be relieved along with parasympathetic system activation, which leads to the relaxation of the body. Aside from feel-good chemicals, nor-adrenaline and serotonin contribute enormously to pain relief via attenuated transmission of the brain's descending impulse. The descending control system is a sensory neuron fiber that runs from the midbrain (precisely the peri-aqueductal gray matter) to the inter-neuronal inhibitory system [50–52]. The system will remain active in response to the

stimulus of soft music, which inhibits the transmission of the pain stimulus. Music therapy has been shown to stimulate the axons or nerve fibers on the ascending tracts of RAS neurons (Reticular Activating System). The stimulus is transmitted to the cerebral cortex, limbic system, and corpus callosum through the autonomous nervous and neuro-endocrine systems. When one is immersed in soft music, the limbic system is aroused, causing it to secrete phenylethylamine (neuroamin), which controls impulse and mood emotion. Music stimulates the parasympathetic nervous system to work on the sympathetic nerves, causing the switch to alpha-type brain waves to yield soothing outcomes on the autonomic nervous system [53–55].

The physiological justification backs up the study's finding that music therapy has a positive effect on reducing or relieving anxiety and pain in children. Nurses ought to employ a combination of pharmacologic and non-pharmacologic interventions to relieve pain and avoid the medication's unwanted side effects [56]. It lays the hypothetical underpinnings for skillful or qualified nurses to gain new knowledge of other methods effective in relieving pain and anxiety, such as the use of music therapy, in health-care facilities. It echoes the assertion made by Huang, Good, and Zauszniewski [48] that music therapy is one of the interventional techniques that has concrete proof nursing theories to proficiently alleviate anxiety and pain.

Indeed although all considerations included in this integrator writing survey are of tall or great quality, it is conceivable that the comes about might have been impacted by pondering confinements. For case, a few ponder utilized a little test measure or did not incorporate a test estimate calculation. Test estimate was famous when evaluating the quality of each article. In expansion, most things did not dazzle the analysts, spectators, or members. Even though blinding in the investigation is critical to play down any conceivable inclination, it is troublesome to do so with music-based mediations, especially live music.

Two studies used an invalidated pain or anxiety scale in the study population, which was highlighted when appraising the precision of each article [37,41]. Because pain and anxiety are

subjective, they are challenging to assess. Standardized pain and anxiety scales are used by providers to assess pain and anxiety, especially in nonverbal or nonresponsive patients. CHEOPS, FACES, FPS-R, NRS, and VAS pain scales were used in the studies. The m-YPAS and STAIC anxiety scales were used in the studies. While there are numerous pain and anxiety scales available, a validated and user-friendly pain or anxiety scale may not always be obtainable or ubiquitously used for the workforce being ascertained.

A wide age range of participants was used in multiple studies. From infancy to adolescence, children's emotions, personalities, behavior, and speech will grow and develop. The way children react to stimuli like pain and anxiety will vary based on their developmental stage and age. Despite the fact that the studies only looked at children aged 0 to 18, the use of such a wide age range of individuals makes the reliability analysis of the findings questionable.

LIMITATION

In our search for full-text articles, we only collected 12 articles due to the limited access we faced, which prevented us from further exploring the magnitude of the effect of music therapy on pain and anxiety in children in the form of a meta-analysis. Some of the studies we include are also in the Some Concern category, so using the results of this study requires caution. However, we believe that nurses can apply music therapy autonomously in managing pain and anxiety in children as a form of nursing implementation and improving the quality of care.

CONCLUSION

For children in the hospital, pain, and anxiety often come to them in various incredibly invasive medical procedures. Music therapy can be the first choice for nurses to offer children with minimal side effects and is friendly to children's conditions. Physiologically, music therapy can trigger natural analgesics in the body through neurohormones that have a calming effect. Based on studies

that apply music therapy, the type of music generally used in classical music is delivered through headphones. Future studies can further examine how music therapy influences chronic pain conditions in children.

Conflict of Interests

There is no conflict of interest.

Ethical Approval

Ethics approval Ethical approval will not be required because this study will retrieve and synthesize data from already published studies.

Acknowledgments

We would like to express our gratitude to all parties, particularly the director of Health Polytechnic of Jambi.

Author's Contribution

All authors equally contributed to preparing this article.

Funding/Support

This research did not receive any specific grant from funding agencies in the public, commercial, or not for profit sectors.

REFERENCES

1. van der Heijden MJE, Jeekel J, Rode H, Cox S, van Rosmalen J, Hunink MGM, et al. Can live music therapy reduce distress and pain in children with burns after wound care procedures? A randomized controlled trial. *Burns*. 2018;44(4):823–33.
2. Anggerainy SW, Wanda D, Nurhaeni N. Music therapy and story telling: Nursing interventions to improve sleep in hospitalized children. *Comprehensive child and adolescent nursing*. 2019;42(sup1):82–9.
3. Zhu X, Haegele JA, Healy S. Movement and mental health: Behavioral correlates of anxiety and depression among children of 6–17 years old in the US. *Mental Health and Physical Activity*. 2019;16:60–5.
4. Gomes GLL, Fernandes M das GM, Nóbrega MML da. Hospitalization anxiety in children: conceptual analysis. *Revista brasileira de enfermagem*. 2016;69:940–5.
5. Li WHC, Chung JOK, Ho KY, Kwok BMC. Play interventions to reduce anxiety and negative emotions in hospitalized children. *BMC pediatrics*. 2016;16(1):1–9.
6. Delvecchio E, Salcuni S, Lis A, Germani A, Di Riso D. Hospitalized children: anxiety, coping strategies, and pretend play. *Frontiers in public health*. 2019;7:250.
7. Gogoularadja A, Bakshi SS. A Randomized study on the efficacy of music therapy on pain and anxiety in nasal septal surgery. *International Archives of Otorhinolaryngology*. 2020;24:232–6.
8. Cırık V, Efe E. THE EFFECT OF MUSIC THERAPY IN CHILDREN’S HEALTH. *Journal of Educational & Instructional Studies in the World*. 2018;8(2).
9. Chow CHT, Van Lieshout RJ, Schmidt LA, Dobson KG, Buckley N. Systematic review: audiovisual interventions for reducing preoperative anxiety in children undergoing elective surgery. *Journal of pediatric psychology*. 2016;41(2):182–203.
10. Lerwick JL. Minimizing pediatric healthcare-induced anxiety and trauma. *World journal of*

- clinical pediatrics. 2016;5(2):143.
11. Fronk E, Billick SB. Pre-operative anxiety in pediatric surgery patients: Multiple case study analysis with literature review. *Psychiatric Quarterly*. 2020;91(4):1439–51.
 12. Johnson AA, Berry A, Bradley M, Daniell JA, Lugo C, Schaum-Comegys K, et al. Examining the effects of music-based interventions on pain and anxiety in hospitalized children: An integrative review. *Journal of Pediatric Nursing*. 2021;60:71–6.
 13. Bawa M, Mahajan JK, Aggerwal N, Sundaram J, Rao KLN. Barriers to pediatric pain management in children undergoing surgery: A survey of health care providers. *Journal of Pain & Palliative Care Pharmacotherapy*. 2015;29(4):353–8.
 14. Katende G, Mugabi B. Comforting strategies and perceived barriers to pediatric pain management during IV line insertion procedure in Uganda’s national referral hospital: A descriptive study. *BMC pediatrics*. 2015;15(1):1–8.
 15. Greenfield K, Carter B, Harrop E, Jassal S, Bayliss MJ, Renton K, et al. Healthcare professionals’ experiences of the barriers and facilitators to pediatric pain management in the community at end-of-life: a qualitative interview study. *Journal of Pain and Symptom Management*. 2022;63(1):98–105.
 16. Sabeti F, Mohammadpour M, Pouraboli B, Tahmasebi M, Hasanpour M. Health Care Providers’ experiences of the non-pharmacological pain and anxiety management and its barriers in the Pediatric Intensive Care Units. *Journal of Pediatric Nursing*. 2021;60:e110–6.
 17. Rudd RA, Aleshire N, Zibbell JE, Gladden RM. Increases in drug and opioid overdose deaths—United States, 2000–2014. *Morbidity and mortality weekly report*. 2016;64(50 & 51):1378–82.
 18. Gaither JR, Shabanova V, Leventhal JM. US national trends in pediatric deaths from prescription and illicit opioids, 1999-2016. *JAMA network open*. 2018;1(8):e186558–e186558.

19. Bizzio R, Cianelli R, Villegas N, Hooshmand M, Robinson M, Hires KA, et al. Exploring non-pharmacological management among anesthesia providers to reduce preoperative distress in children. *Journal of pediatric nursing*. 2020;50:105–12.
20. Giordano F, Zanchi B, De Leonardis F, Rutigliano C, Esposito F, Brienza N, et al. The influence of music therapy on preoperative anxiety in pediatric oncology patients undergoing invasive procedures. *The Arts in Psychotherapy*. 2020;68:101649.
21. Ugglä L, Bonde L, Hammar U, Wrangsjö B, Gustafsson B. Music therapy supported the health-related quality of life for children undergoing haematopoietic stem cell transplants. *Acta paediatrica*. 2018;107(11):1986–94.
22. Mondanaro JF, Sara GA, Thachil R, Pranjić M, Rossetti A, Sim GE, et al. The effects of clinical music therapy on resiliency in adults undergoing infusion: a randomized, controlled trial. *Journal of Pain and Symptom Management*. 2021;61(6):1099–108.
23. Melzack R, Wall PD. Pain Mechanisms: A New Theory: A gate control system modulates sensory input from the skin before it evokes pain perception and response. *Science*. 1965;150(3699):971–9.
24. Finnerty R. Music therapy as an intervention for pain perception. Anglia Ruskin University, Cambridge, England. 2006;
25. Bulut M, Alemdar DK, Bulut A, Şalcı G. The effect of music therapy, hand massage, and kaleidoscope usage on postoperative nausea and vomiting, pain, fear, and stress in children: A randomized controlled trial. *Journal of Perianesthesia Nursing*. 2020;35(6):649–57.
26. Stegemann M. therapy and other music-based interventions in pediatric health care: An overview. *Medicines*;
27. Ainscough SL, Windsor L, Tahmassebi JF. A review of the effect of music on dental anxiety in children. *European Archives of Paediatric Dentistry*. 2019;20(1):23–6.
28. Klassen JA, Liang Y, Tjosvold L, Klassen TP, Hartling L. Music for pain and anxiety in

- children undergoing medical procedures: a systematic review of randomized controlled trials. *Ambulatory pediatrics*. 2008;8(2):117–28.
29. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *International Journal of Surgery*. 2021;88:105906.
30. Programme CAS. CASP randomised controlled trial checklist. 2018.
31. Balan R, Bavdekar SB, Jadhav S. Can Indian classical instrumental music reduce pain felt during venepuncture? *The Indian Journal of Pediatrics*. 2009;76(5):469–73.
32. Franzoi MAH, Goulart CB, Lara EO, Martins G. Music listening for anxiety relief in children in the preoperative period: a randomized clinical trial. *Revista latino-americana de enfermagem*. 2016;24.
33. Sabzevari A, Kianifar H, Jafari SA, Saeidi M, Ahanchian H, Kiani MA, et al. The effect of music on pain and vital signs of children before and after endoscopy. *Electronic physician*. 2017;9(7):4801.
34. Kazemi S, Ghazimoghaddam K, Besharat S, Kashani L. Music and anxiety in hospitalized children. *Journal of Clinical and Diagnostic Research*. 2012;6(1):94–6.
35. Kim SJ, Oh YJ, Kim KJ, Kwak Y-L, Na S. The effect of recorded maternal voice on perioperative anxiety and emergence in children. *Anaesthesia and intensive care*. 2010;38(6):1064–9.
36. Longhi E, Pickett N, Hargreaves DJ. Wellbeing and hospitalized children: can music help? *Psychology of music*. 2015;43(2):188–96.
37. Nguyen TN, Nilsson S, Hellström A-L, Bengtson A. Music therapy to reduce pain and anxiety in children with cancer undergoing lumbar puncture: a randomized clinical trial. *Journal of Pediatric Oncology Nursing*. 2010;27(3):146–55.
38. Noguchi LK. The effect of music versus nonmusic on behavioral signs of distress and self-

- report of pain in pediatric injection patients. *Journal of Music Therapy*. 2006;43(1):16–38.
39. Suresh S, De Oliveira GS, Suresh S. The effect of audio therapy to treat postoperative pain in children undergoing major surgery: a randomized controlled trial. *Pediatric Surgery International*. 2015;31(2):197–201.
40. Liu Y, Petrini MA. Effects of music therapy on pain, anxiety, and vital signs in patients after thoracic surgery. *Complementary therapies in medicine*. 2015;23(5):714–8.
41. Yu H, Liu Y, Li S, Ma X. Effects of music on anxiety and pain in children with cerebral palsy receiving acupuncture: A randomized controlled trial. *International Journal of Nursing Studies*. 2009;46(11):1423–30.
42. Wang C-F, Sun Y-L, Zang H-X. Music therapy improves sleep quality in acute and chronic sleep disorders: A meta-analysis of 10 randomized studies. *International journal of nursing studies*. 2014;51(1):51–62.
43. Good M, Anderson GC, Ahn S, Cong X, Stanton-Hicks M. Relaxation and music reduce pain following intestinal surgery. *Research in nursing & health*. 2005;28(3):240–51.
44. Gutgsell KJ, Schluchter M, Margevicius S, DeGolia PA, McLaughlin B, Harris M, et al. Music therapy reduces pain in palliative care patients: a randomized controlled trial. *Journal of pain and symptom management*. 2013;45(5):822–31.
45. Chaput-McGovern J, Silverman MJ. Effects of music therapy with patients on a post-surgical oncology unit: A pilot study determining maintenance of immediate gains. *The Arts in Psychotherapy*. 2012;39(5):417–22.
46. Allred KD, Byers JF, Sole M Lou. The effect of music on postoperative pain and anxiety. *Pain Management Nursing*. 2010;11(1):15–25.
47. Wurjatmiko AT. The effects of music therapy intervention on the pain and anxiety levels of cancer patient: A systematic review. *International Journal of Nursing Education*. 2019;11(4):14–8.

48. Huang S-T, Good M, Zauszniewski JA. The effectiveness of music in relieving pain in cancer patients: a randomized controlled trial. *International journal of nursing studies*. 2010;47(11):1354–62.
49. Aktaş YY, Karabulut N. The use of cold therapy, music therapy and lidocaine spray for reducing pain and anxiety following chest tube removal. *Complementary therapies in clinical practice*. 2019;34:179–84.
50. Cowen R, Stasiowska MK, Laycock H, Bantel C. Assessing pain objectively: the use of physiological markers. *Anaesthesia*. 2015;70(7):828–47.
51. McInnis PM, Braund TA, Chua ZK, Kozłowska K. Stress-system activation in children with chronic pain: a focus for clinical intervention. *Clinical Child Psychology and Psychiatry*. 2020;25(1):78–97.
52. Wei Y, Liang Y, Lin H, Dai Y, Yao S. Autonomic nervous system and inflammation interaction in endometriosis-associated pain. *Journal of Neuroinflammation*. 2020;17(1):1–24.
53. Riganello F, Cortese MD, Arcuri F, Quintieri M, Dolce G. How can music influence the autonomic nervous system response in patients with severe disorder of consciousness? *Frontiers in neuroscience*. 2015;9:461.
54. Akimoto K, Hu A, Yamaguchi T, Kobayashi H. Effect of 528 Hz music on the endocrine system and autonomic nervous system. *Health*. 2018;10(09):1159.
55. Yamashita K, Kibe T, Ohno S, Kohjitani A, Sugimura M. The effects of music listening during extraction of the impacted mandibular third molar on the autonomic nervous system and psychological state. *Journal of Oral and Maxillofacial Surgery*. 2019;77(6):1153-e1.
56. Yaban ZS. Usage of non-pharmacologic methods on postoperative pain management by nurses: Sample of turkey. *International Journal of Caring Sciences*. 2019;12(1):529–41.

Healthy Nurses: Tips for Enhancing Mental, Emotional, and Spiritual Well-being

Monica Jaramillo^{1*}

1. Independent Author, Florida, US

**Corresponding Author:* Monica Jaramillo DNP, MSN/Ed., RN-NLC, CNE®n, CCRN.

Instructor, mentor, and tutor of various healthcare programs and currently not affiliated with any institution when I submitted this manuscript to the Journal. Florida, US. Email:

MonicaJaramilloDNP@Gmail.com

Open Researcher and Contributor ID: <https://orcid.org/0009-0005-0572-4061>

Commentary

DOI: [10.32549/OPI-NSC-93](https://doi.org/10.32549/OPI-NSC-93)

Submitted: 18 April 2023

Revised: 09 May 2023

Accepted: 19 May 2023

Published online: 29 May 2023

This article is licensed under the Creative Commons Attribution - Non Commercial - No Derivatives 4.0 (CC BY NC ND 4.0) international license.

Abstract

Introduction: Recent literature suggests a detrimental burden affecting nurses of all settings and backgrounds. Mental and emotional problems such as moral distress, burnout, compassion fatigue, depression, and severe stress are a few of the many issues nurses are experiencing worldwide. Nurses need enhanced guidance and support regarding caring for their health and well-being.

Discussion: It is imperative to advocate for healthier nurses worldwide. Nurses are experiencing several mental issues and burnout due to a lack of resilience and self-care management. All key stakeholders internationally need to aid nurses with feasible tools that promote mindfulness and improvement of self-care while ensuring stability. The key to enhancing nurses' mental, emotional, and spiritual well-being could be to offer holistic support conducive to mind-body-spirit and physical health.

Keywords: Healthy Nurses; Holistic; Wholistic; Mental; Emotional; Spiritual; Well-being.

Introduction

Nursing is a caring and compassionate profession full of holistic practices that advocate for the health and well-being of entire communities. Unfortunately, nurses worldwide continue failing in the call to care for themselves in the same empathetic manner as they care for others.^[1-3] Nurses nowadays face burnout, fatigue, depression, and severe mental problems such as moral distress and compassion fatigue, to name some of the many stressors, at an exponential rate.^[1,2] Healthy nurses are associated with better care outcomes since they represent strong role models for the community and positive health and wellness advocates.^[1-3] It is time to advocate more actively for our nurses' health and well-being while providing support conducive to enhancing their mental, emotional, and spiritual well-being. This work aims to inspire change in nursing through practical advice for all stakeholders while empowering nurses to build resilience and positive self-care practices.

Healthy nurses care for their physical, emotional, spiritual, and mental health while living life to its maximum capacity. Healthy nursing professionals prioritize their well-being as much as they prioritize those they care for. These nurses represent significant advocacy to all communities as they role-model positive and empathetic self-care practices conducive to healthy and meaningful living.^[3] Indeed, the health and well-being of nurses are valuable and essential concepts to cultivate to ensure positive outcomes. The importance of healthy nurses is entitled to the impact of these professionals on their communities.^[1-3] Nurses are the caregivers and the image many have to look after. Many individuals from all communities around the globe follow nurses' advice regarding healthy living, and these individuals see nurses as their exemplars of living meaningful lives.^[1,2] It is time for nurses of all practice settings and levels of expertise to take a more active role in their health while using the available resources to live their lives to the fullest. Seek help in your institutions or from national and international associations. Many resources are at hand to support you in all ways that ensure the professional development and advancement of the nursing profession and the health and well-being of all nurses. One example of the multiple national resources

available for nurses in the United States is the American Nurses Association (ANA). This organization represents and supports 4.3M nurses nationwide while empowering them to thrive in all aspects of their personal and professional lives.^[4] The multiple initiatives ANA has established to ensure healthy nurses while ensuring a healthy country are worth exploring. In the end, it all entitles building resilience and incorporating self-care. Nurses' resilience represents coping with unforeseen or stressful situations and returning to healthy and balanced wellness after a crisis, while self-care promotes mind and body wholeness.^[5,6] This composition explores the definition and importance of healthy nurses, tips for building resilience, feasible techniques for wholistic self-care, and recommendations. This commentary includes a discussion and a conflict of interest statement.

Discussion

Resilience is the ability to withstand adversity.^[5] Undoubtedly, all nurses, despite their area of expertise, face some level of difficulty and stress. Nurses must be mindful of the need to adapt to challenging situations successfully.^[5,6] This author's most remarkable experiences with resilience and mindfulness arise from clinical experiences in intensive care and the pressure of completing advanced-practice nursing degrees of education toward the terminal degree in nursing. The chaos of multiple professional and personal demands and the responsibility of caring for patients in a life-death environment is highly challenging. Still, from tough situations like this emerge great realizations. Accordingly, the scientific evidence around the globe is conclusive in suggesting that nurses worldwide need mental and emotional support to mitigate their stress and burnout.^[1-3] It is imperative for nurses to improve their resilience and for all key stakeholders to support the health and well-being of nurses with tools that will enhance wholeness.^[5,6] Some of the most helpful tips for building resilience in this author's experience include using all the available resources, starting soon in the career, practicing gratitude, sparking the passion for nursing often, and taking enough time for self-care daily. In this regard, seeking help when first needed while exploring resources

such as counseling, mentoring, connections, or community programs is ideal. Similarly, gratitude and purpose or passion for nursing can increase resilience. Lastly, self-care is another valuable component of resilience worth exploring separately.

Self-care is also vital for every person's health and well-being, not just for nurses. This concept means taking care of self while ensuring both physical and mental, spiritual, and mental health in a comprehensive or wholistic manner. Now, wholistic can mean different things to different people, and the term may be unknown to many others.^[7] For this author, this term means ensuring holistic practices that entitle the whole aspects of the person and caring for self comprehensively and holistically while embracing mind-body-spirit. Seeing self-care from this wholistic approach can be the key to improve not only resilience but nurses' mental, physical, emotional, and spiritual well-being.

In this author's experiences, feasible techniques to ensure wholistic self-care in nurses and all individuals despite their culture and background are as follows. First, be true to yourself by following your mind and heart's desires. Advocating for your well-being first is vital, as hard as this may sound for many nurses considering our call to serve others. Follow your preferences, call to help, and continue that path with your health in mind. Second, perform regular physical activities that are attractive to you personally. This step can be as simple as taking the stairs at work instead of the elevator to have peace of mind that you are incorporating self-care into your daily practices. Third, engage in excellence groups or advocacy associations of your interest as much as possible to promote self-pride. Fourth, be an active advocate for self-care practices in your organization. For this, you may explore the available resources and recommend a practice change policy that promotes more initiatives to ensure the health and well-being of nursing staff. Lastly, do not forget to be kind to yourself and reward yourself often for your achievements.

It is imperative to ensure the health and well-being of nurses around the globe. Healthy nurses are professionals who live their lives to the fullest while inspiring the community to live

healthy and meaningful lives. Ensuring nurses' physical, mental, emotional, and spiritual well-being requires strong resilience and conscious self-care. These wholistic practices can positively impact all nurses directly while indirectly improving entire communities' health. It is time to increase advocacy regarding nurses' health while reminding these professionals to utilize available resources, seek help when needed, practice activities they enjoy, ensure self-care as part of their daily routines, and be kind to themselves. The author hopes to inspire all stakeholders to advocate for healthier nurses and invites further research and studies concerning this vital topic for global public health.

Funding Statement

This research received no external funding.

Conflict of Interest Statement

The author declares no conflict of interest

References

1. Wand T, Glover S, Paul D. What should be the future focus of mental health nursing? Exploring the perspectives of mental health nurses, consumers, and allied health staff. *International Journal of Mental Health Nursing*. 2021;31(1).
2. Khatatbeh H, Pakai A, Al-Dwaikat T, et al. Nurses' burnout and quality of life: A systematic review and critical analysis of measures used. *Nursing Open*. 2021;9(3).
3. Rykkje L, Søvik MB, Ross L, McSherry W, Cone P, Giske T. Educational interventions and strategies for spiritual care in nursing and healthcare students and staff: A scoping review. *Journal of Clinical Nursing*. 2021.
4. American Nurses Association. Healthy Nurse, Healthy Nation [Internet]. American Nurses Association; [cited 2023 April 18]. Available from: <https://www.nursingworld.org/practice-policy/hnhn/>
5. Janzarik G, Wollschläger D, Wessa M, Lieb K. A group intervention to promote resilience in nursing professionals: A randomised controlled trial. *International Journal of Environmental Research and Public Health*. 2022;19(2):649.
6. Zeb H, Arif I, Younas A. Mindful self-care practice of nurses in acute care: A multisite cross-sectional survey. *Western Journal of Nursing Research*. 2021;44(6):019394592110045.
7. Chizhande I. No health without wholistic health: An empirical approach to mental health cultivation. *Asian Journal of Research in Social Sciences and Humanities*. 2022;12(4):416-424.

**Systems compared: Capillary glucose self-monitoring and
Flash glucose monitoring system. Cross-sectional study**

Francesco Saverio Auricchio^{1*}, Maria Russo²,

Maddalena Lettieri¹, Nicolas Craparotta¹

¹Department of Translation Medical Sciences, University Federico II, Naples.

²San Giovanni di Dio Civil Hospital of Frattamaggiore, Asl Naples 2 North,
Naples.

***Corresponding author:** Francesco Saverio Auricchio, Department of Translation Medical
Sciences, University Federico II, Naples.

Email: francescosaverio.auricchio@unina.it

Original article

DOI: [10.32549/OPL-NSC-94](https://doi.org/10.32549/OPL-NSC-94)

Submitted: 19 December 2022

Revised: 11 May 2023

Accepted: 12 May 2023

Published online: 29 May 2023

***This article is licensed under the Creative Commons Attribution - Non
Commercial - No Derivatives 4.0 (CC BY NC ND 4.0) international
licence.***

ABSTRACT

Introduction: In recent years, with the rapid advancement of technology, tools capable of minimising discomfort for the diabetic patient are becoming increasingly popular, thereby increasing adherence to treatment. The use of technology improves glycometabolic compensation and quality of life.

Objective: The aim of the present study is to verify, in the group using the Flash Glucose Monitoring system, improved diabetes management and satisfaction in insulin-treated patients.

Materials and Methods: A retrospective cross-sectional study was performed through the administration of the "Diabetes Treatment Satisfaction Questionnaire". The study was performed from January to July 2019. 82 validated questionnaires were administered in the Italian version. Participants were 47 women (39 Type 1 Diabetes Mellitus and 8 Type 2 Diabetes Mellitus) and 35 men (19 Type 1 Diabetes Mellitus and 16 Type 2 Diabetes Mellitus).

Results: Results show that subjects with the Flash Glucose Monitoring system have greater satisfaction than those using the Self-Monitoring of Blood Glucose system. Patients using Flash Glucose Monitoring showed 83.9% satisfaction, while patients using Self-Monitoring of Blood Glucose showed 33.3% complete satisfaction. The average glycosylated haemoglobin of the group of subjects using Flash Glucose Monitoring was 53.2 mmol/mol, while that of subjects with self-monitoring of capillary blood glucose was 60.3 mmol/mol.

Conclusions: The adoption of new technologies has benefits for the patient that positively affect quality of life. The study showed better glycometabolic compensation in the group of patients using Flash Glucose Monitoring. Diabetes carries significant costs to public health, and prevention and improvement of care could be a primary goal for the community and health systems.

Keywords: Diabetes mellitus; Telemedicine; Technology; Flash glucose monitoring; Self-monitoring of blood glucose

INTRODUCTION

Diabetes mellitus is a chronic disease characterised by increased concentration of glucose in the blood. The vast majority of diabetes cases fall into two broad aetiopathogenic categories. In one category, Type 1 Diabetes Mellitus (DMT1), the cause is an absolute lack of insulin secretion due to an autoimmune pathological process that occurs in the pancreatic islets and/or genetic alterations. In the other category, Type 2 Diabetes Mellitus (DMT2), the cause is a combination of resistance to insulin activity and an inadequate compensatory insulin secretory response. In the latter category, a degree of hyperglycemia sufficient to cause pathological and functional alterations in various target tissues, but without clinical symptoms, may be present for a long time before diabetes is detected [1].

DMT2 is considerably the most frequent form of diabetes (it affects 90% of cases) and is typical of middle age. It emerges as a multifactorial disease that involves both genetic predisposition and multiple environmental factors [2]. In 2021, the International Diabetes Federation (IDF) estimated that 537 million were diagnosed with diabetes mellitus and predicted that this figure will reach 643 million by 2030 and 783 million by 2045. In addition, the IDF estimated that, in 2021, 541 million people had reduced glucose tolerance. The number of children and adolescents living with diabetes is constantly increasing. In 2021, more than 1.2 million children and adolescents were diagnosed with Type 1 Diabetes Mellitus.

Direct health expenditures due to diabetes are already close to \$1 trillion and will exceed this figure by 2030. The 10th edition of the IDF Diabetes Atlas also shows that hyperglycaemia in pregnancy affects about one in six pregnancies. Another cause for alarm is the consistently high percentage (45%) of people with undiagnosed diabetes, which is predominantly type 2. This highlights the urgent need to improve the ability to diagnose people with diabetes, many of whom do not know they have the condition, and to provide appropriate and timely care to all people with diabetes as soon as possible [3]. One-fifth of people with type 1 diabetes are in low- and lower-middle-income

countries. The residual life expectancy of a 10-year-old child diagnosed with Type 1 Diabetes Mellitus in 2021 ranged from an average of 13 years in low-income countries, to 65 years in high-income countries [4].

Diabetes therapy is often substitutive and is based on partly frequent or continuous insulin administrations. The objective of replacement therapy is to maintain blood glucose concentrations in a physiological range, trying to avoid or in any case limit both episodes of hypoglycaemia and hyperglycaemia. It is therefore necessary to continuously harmonise insulin therapy, nutrition and exercise, also taking into account the hyperglycaemic effect of stress, intercurrent diseases and, in the case of the child, even in changes in a growing body [5]. To be able to live with your diabetes, without being overwhelmed by it, you need good blood sugar control. To judge the effectiveness of the control, it is necessary to measure the reactions of the body to the treatment, even if you are not on drug therapy, but proper care is based on lifestyle changes and physical activity [6]. Through monitoring, it is possible to intervene in the most appropriate way, bringing or maintaining blood glucose levels as close as possible to the reference values [7]. The American Diabetes Association (ADA) recommends that all diabetics try by any and all means to maintain blood sugar control so as to reduce the risk of complications [8].

Diabetes, a systemic disease not to be overlooked, has chronic complications that can also be disabling and fatal. Diabetes presents macrovascular complications, including coronary heart disease, stroke, and peripheral vascular disease, and microvascular complications, such as end-stage renal disease, retinopathy, and neuropathy, along with lower limb amputations. Complications are responsible for much of the health spending associated with diabetes. There is also a growing recognition of a diverse set of causal conditions, including cancers, ageing-related outcomes (e.g. dementia), infections, and liver disease [9]. Daily monitoring of diabetes, due to frequent capillary sampling obtained by finger prick, is painful and this can make it difficult to adhere to a diabetes management plan. In recent years, thanks to the increasing number of technologies available for

glycaemic monitoring and insulin administration, there has been a real revolution in the care of people with diabetes mellitus [10].

The Flash Glucose Monitoring (FGM) system avoids inconvenience to patients due to repeated capillary punctures, providing continuous measurement of blood glucose [11] through a system consisting of a small circular sensor applied to the back of the arm that, at intervals of one minute, measures glucose in the interstitial fluid, by means of a small filament inserted under the skin and held in place by a small adhesive pad. Using this circuit, the patient is able to detect blood glucose in real time, and wirelessly transmit all the information necessary to evaluate the glycaemic trend.

The purpose of this study is to look at the impact of the FGM system on glycaemic control in insulin-treated diabetic patients, verifying whether those who use the FGM system have better diabetes management, as well as a better degree of satisfaction than those who use Self-monitoring of Blood Glucose (SMBG).

MATERIALS AND METHODS

The following cross-sectional study was carried out by administering a questionnaire validated in its Italian version, found in the international literature. The Italian adaptation of the “Diabetes Treatment Satisfaction Questionnaire” (DTSQ) was used [12]. This questionnaire has been specifically designed to measure satisfaction with diabetes treatments and can be used in both patients with type 1 diabetes and those with type 2 diabetes. The level of treatment satisfaction in the two patient groups (FGM and SMBG) and the frequency of perception of episodes of hypoglycaemia and hyperglycaemia were analysed and compared. The study began in January 2019 and was completed in July of the same year. 82 questionnaires of the validated Italian version of the DTSQ were administered. The questionnaire includes 8 questions, 6 of which are added together in a single score that varies between 8 (very unsatisfied) and 36 (very satisfied). The remaining two questions, used individually, explore the perceived frequency of episodes of hypo- and

hyperglycaemia [13], through an incremental score of 1 (never) to 6 (very often). We also investigated the personal characteristics of the sample (gender and age), the type of diabetes (DMT1 and DMT2), the methods of glycaemic control (SMBG and FGM) and the value of glycosylated haemoglobin (HbA1c).

The questionnaires were administered online, on Facebook™ social media and through the Google Forms™ platform, within special groups dedicated to the diabetic patient, namely Diabetica: il gruppo sul diabete tipo 1, Diabete.com, Diabetici Insieme. The survey was conducted through the use of convenience sampling. Adherence to the questionnaire was voluntary and the questionnaire was made anonymous at source. The consent to the participation and use of the data was considered acquired at the time of sending the questionnaire. The data were analysed in aggregate form. Approval by the Local Ethics Committee was not required for this type of study.

The following inclusion criteria were defined: subjects of both sexes, patients with DMT1, patients with DMT2, patients on pharmacological treatment, patients aged > 6 years. The following exclusion criteria were defined: patients aged < 6 years, patients not pharmacologically treated or patients who follow only a diet and/or physical activity.

Statistical analyses

The data collected were processed through the use of the “LibreOffice6.2™” package for descriptive statistical analysis. The same data were analysed with the statistical software “RStudio™” for the analysis of the variables under analysis. Data are presented as number and percentage for categorical variables and continuous data are expressed as mean ± standard deviation (SD), median and interquartile range (IQR). The confidence interval (CI) was calculated for mean age and HbA1c. The different variables were analysed and correlated to assess whether there were differences in diabetes management and satisfaction in the two patient groups (SMBG and FGM). The chi-squared test was performed for the two levels of satisfaction obtained in relation to the two

types of treatment. The Shapiro-Wilk test was used to determine whether the variables were distributed normally and, subsequently, the non-parametric Wilcoxon-Mann-Whitney test was carried out for unpaired data, since the variables were not distributed normally. All tests with a p-value <0.05 were considered significant.

RESULTS

The sample consisted of 82 diabetic subjects, of whom 58 (70.7%) had a diagnosis of DMT1, while 24 (29.3%) had a diagnosis of DMT2.

The subjects included in the study had a variable age. The mean age was 37.5 years (95% CI: 34.1-40.9; SD=15.4). The study included the distribution of patients according to sex.

The analysis of the data showed greater participation in the completion of the questionnaire by females (47 subjects, equal to 57.3% of the sample) compared to males (35 subjects, equal to 42.7% of the sample). For the purposes of the study, patients were divided according to the type of glycaemic monitoring: SMBG and FGM. On analysing the data, it was observed, as is known, that the glycemic self-monitoring system using capillary puncture is the most widespread system.

Of the 82 subjects who participated in the study, 51 subjects used the SMBG system (62.2%) and 31 subjects (37.8%) used the FGM system. The different levels of satisfaction for the related types of monitoring were also analysed.

For the evaluation of the different levels of satisfaction, of a maximum score of 36 (sum of the maximum scores of each score), a score < 12 was considered as totally unsatisfactory, a score between 12 and 24 as partially satisfactory and finally a score between 24 and 36 as satisfactory. The scores obtained were categorised and analysed.

The results, extrapolated from the questions investigating objective data, were stratified according to gender and are reported in Table 1.

	Male	Females	Total sample
AGE			
mean years $\pm$ SD	38.3 $\pm$ 13.6	36.9 $\pm$ 16.7	37.5 $\pm$ 15.4
median (IQR)	38 (16.5)	35 (23)	36.5 (22.2)
GENDER % (n)	42.7 (35)	57.3 (47)	82
DMT1 %(n)	23.2 (19)	47.5 (39)	58
DMT2 %(n)	19.5 (16)	9.8 (8)	24
SMBG %(n)	26.8 (22)	35.4 (29)	51
FGM %(n)	15.8 (13)	22.0 (18)	31
HbA1C (mmol/mol)			
mean $\pm$ SD	58.9 $\pm$ 13.9	56.7 $\pm$ 14.8	57.6 $\pm$ 14.4
median (IQR)	57 (21)	53 (15.5)	54.5 (18)

Table 1. Characteristics of 82 diabetic patients stratified by gender.

The effectiveness of diabetes treatment should not be assessed solely on the basis of HbA1c levels as it should also focus on patient-reported outcomes such as patient satisfaction, well-being and quality of life. The DTSQ was developed to assess patient satisfaction in the treatment of diabetes.

Table 2 shows the results obtained from the questionnaire.

Item	Score 1 %(n)	Score 2 %(n)	Score 3 %(n)	Score 4 %(n)	Score 5 %(n)	Score 6 %(n)
How satisfied are you with your current treatment?	6 (5)	11 (9)	21 (17)	27 (22)	23 (19)	12 (10)
Recently, how often did you feel that your blood sugar was too high?	1 (1)	20 (16)	27 (22)	24 (20)	20 (16)	8 (7)
Recently, how often did you feel that your blood sugar was too low?	11 (9)	21 (17)	23 (19)	21 (17)	13 (11)	11 (9)
How easy/comfortable has your treatment been in recent times?	4 (3)	13 (11)	23 (19)	26 (21)	22 (18)	12 (10)

How flexible has your treatment seemed in recent times?	4 (3)	13 (11)	17 (14)	34 (28)	17 (14)	15 (12)
How satisfied are you with the knowledge you have of your diabetes?	4 (3)	4 (3)	24 (20)	27 (22)	29 (24)	12 (10)
Would you recommend your form of treatment to someone else?	6 (5)	12 (10)	24 (20)	16 (13)	15 (12)	27 (22)
How satisfied would you be to continue with the current form of treatment?	10 (8)	13 (11)	21 (17)	20 (16)	18 (15)	18 (15)

Table 2. Summary of the percentages of responses obtained from the DTSQ questionnaire administered to 82 diabetic patients (the score for each field ranges from 1 to 6, where 1 means "very dissatisfied" and 6 means "very satisfied").

Table 3 shows the results obtained from the DTSQ, stratified into three categories: "Satisfaction yes", "Partial satisfaction", "Satisfaction no",

	Satisfaction Yes % (n)	Partial Satisfaction % (n)	Satisfaction No % (n)
FGM	83.9 (26)	16.1 (5)	0 (0)
SMBG	33.3 (17)	60.8 (31)	5.9 (3)

Table 3. Results obtained according to the evaluation criteria of the scale used (score < 12 = totally unsatisfactory, score between 12 and 24 = partially satisfactory, score between 24 and 36 = satisfactory).

Subjects with the FGM system show greater satisfaction than those using the SMBG system. Patients using Flash Glucose Monitoring showed 83.9% satisfaction, 16.1% partial satisfaction and 0% total dissatisfaction. Patients using capillary glucose self-monitoring, on the other hand, showed

complete satisfaction for 33.3% of the sample (1 out of 3), partial satisfaction for the treatment equal to 60.8% and total dissatisfaction equal to 5.9% (Table 3).

The results obtained show that the FGM group had a dissatisfaction (satisfaction no) value of 0. The purpose of the study was to demonstrate a significant difference in satisfaction in the two different monitoring groups. The results obtained by the partially satisfied (partial satisfaction), considered as negative and not sufficient, were merged with those of the not satisfied (satisfaction no). Table 4 shows the new classification.

	Satisfaction Yes % (n)	Satisfaction No % (n)	p-value
FGM	83.9 (26)	16.1 (5)	p<0.0001
SMBG	33.3 (17)	66.7 (34)	

Table 4. Comparison between the results obtained for "satisfaction yes" and the combined results of "satisfaction no" and "partial satisfaction"

In Table 4 the results obtained for "partial satisfaction" were considered as negative values and therefore added to the values obtained for "satisfaction no".

Table 4 shows a significant relationship between the groups and the satisfaction variable. In particular, the chi-squared test showed a significantly higher presence of satisfaction in the FGM group compared to the SMBG group (19.74, 83.9% vs 33.3%, chi-squared=19.74, p<0.0001). In other words, there is significantly greater treatment satisfaction in diabetic patients using the FGM monitoring system compared to the traditional method (SMBG). Differences in glycosylated haemoglobin were also analysed in the two patient groups. The mean glycosylated haemoglobin of the FGM group was 53.2 mmol/mol (95% CI: 49.0-57.4), while that of subjects with self-monitoring of capillary blood glucose was 60.3 mmol/mol (95% CI: 55.9-64.6).

For inferential analysis, the Wilcoxon-Mann-Whitney nonparametric test was used for two independent samples, as the data distributions were not normal. The different variables covered by the research were compared in relation to the monitoring system used by the patient (Table 5). Statistical analysis of both samples (SMBG and FGM) was performed. The samples were first analysed independently and then compared.

Parameters	FGM vs. SMBG	p-value (test)
Satisfaction Yes	83.9% vs 33.3%	p<0.0001* (C)
HbA1c	Median: 52 vs. 58	p = 0.0052* (S) p = 0.029* (WMW)
Hyperglycaemia	Median: 3 vs. 4	p = 0.0001* (S) p = 0.30 (WMW)
Hypoglycaemia	Median: 3 vs. 4	p = 0.0002* (S) p = 0.22 (WMW)
Tot DTSQ Satisfaction	Median: 29 vs. 19	p = 0.024* (S) p < 0.0001*(WMW)
*=significant test; C=chi squared test; S=Shapiro-Wilk test; WMW=Wilcoxon-Mann-Whitney test;		

Table 5. Comparison between SMBG and FGM samples, regarding the different variables considered in our study, such as Satisfaction yes, HbA1c, Hyperglycaemia, Hypoglycaemia, tot DTSQ Satisfaction.

In the study sample, as seen in the descriptive statistical analysis, there was some difference between the glycosylated haemoglobins of the two groups. This comparison parameter was

analysed using the Wilcoxon-Mann-Whitney test. The test showed that the difference is statistically significant, $p\text{-value} = 0.029$.

Another variable under study was the analysis of the frequency of perception of episodes of both hypoglycaemia and hyperglycaemia. The frequencies of these perceptions were compared for the two classes of patients by performing an inferential analysis. With regard to the comparison of the perception of hypoglycaemic episodes, the test did not show a statistically significant difference, $p\text{-value} = 0.22$. The test also showed no statistically significant significance when comparing the perception of hyperglycaemic episodes, $p\text{-value} = 0.30$.

Finally, the degree of patient satisfaction in relation to the type of monitoring was investigated.

As seen above during the descriptive statistical analysis, there was a significant difference in satisfaction in the two groups. Statistical inference was performed to test whether the relationship between monitoring systems and satisfaction was statistically significant. The non-parametric Wilcoxon-Mann-Whitney test was chosen for two independent samples ($p\text{-value}$ Shapiro-Wilk test = 0.024, so the distribution is not normal).

The test showed a statistically significant difference between the two groups ($p\text{-value} < 0.0001$).

DISCUSSION

Based on the material found in the international scientific literature, the results obtained from the study show a good match in measuring the satisfaction of diabetic patients with blood glucose monitoring. Flash glucose monitoring allows frequent glucose checks with increased time in range and reduced time in hyper- and hypoglycaemia [14]. The use of innovative tools, capable of providing greater patient comfort, is helpful in achieving better outcomes and better management of a chronic condition such as diabetes. The Impact study showed that FGM was able, in comparison to conventional systems, to increase the frequency of monitoring (up to 15 scans per day), reduce the time spent in hypoglycaemia and result in no increase in glycosylated haemoglobin at six

months. FGM decreases hypoglycaemia in patients with DMT1 by an average of 74 minutes per day, with a 38% reduction compared to the control group in the 6 a.m. to 11 p.m. time slot and a 40% reduction in the time spent in hypoglycaemia in the 11 p.m. to 6 a.m. period [15].

A retrospective study, conducted in the US, and a meta-analysis, conducted in the US and Canada, showed that, with the use of the FGM system, glycosylated haemoglobin was significantly reduced in DMT2 [16].

The FGM system tends to improve treatment satisfaction, can lead to improved glycaemic control in patients with DMT2 undergoing multi-injection therapy, without increasing the frequency of hypoglycaemia [17], improving daily glycaemic control and self-care behaviour [18].

The research included the administration of the DTSQ in order to be able to analyse possible differences between the two monitoring groups and confirmed what has been stated by the various studies in the literature. The analysed sample is not representative of the entire population of diabetics as it comes from the online patient groups only, however, the patients belong to different settings as well as to different regions. In agreement with the findings in the literature, this research has shown that the use of the FGM system improves the quality of life and satisfaction of patients and promotes their well-being. The FGM system not only benefits the patient, who has greater awareness of glucose trends throughout the day, but also benefits the physician himself, who can better monitor diabetes compensation, hypoglycaemic and hyperglycaemic load in order to make the necessary changes to drug treatment [19]. Research has shown the benefits of using innovative monitoring systems.

This system is easy to wear and, with a painless scan, allows the measurement of glucose levels in the interstitial fluids of people with diabetes mellitus, even through clothing. Each scan shows both the current glucose value and the glucose data for the last 8 hours. A trend arrow helps the patient to assess the trend of blood sugar: whether it is increasing or decreasing and at what rate. These graphs allow adult patients and parents of children with diabetes to take all the necessary steps to avoid

serious glycaemic imbalances. Indeed, the FGM system avoids repetitive fingertip pricks for blood glucose measurement, which cause pain, embarrassment and discomfort to the patient, and consequently allows more frequent glucose monitoring. This allows optimal management of the disease and its complications, helping to prevent, and thus reduce, episodes of hypoglycaemia and hyperglycaemia. In this regard, an additional variable was considered in the study, which involved analysing the frequency of perception of episodes of both hypoglycaemia and hyperglycaemia for the two classes of patients by performing an inferential analysis. However, the difference was not statistically significant. In addition to the limited sample size, this is due to the problems of perception of the problem and the type of data collected (self-reported).

The burden of caring for people with diabetes is considerable and the cost grows exponentially as co-morbidities increase, with hospitalisation being the main cost factor. The FGM system promotes the self-care of patients with diabetes mellitus and can help prevent acute disease-related events such as ketoacidosis and severe hypoglycaemia, thus reducing hospitalisations. Investing resources in new technologies, and thus in treatments and devices that reduce diabetes-related events, is a cost-effective strategy and thus amounts to reducing costs for the SSN (National Health Service).

The FGM system also fits well with the recent development of new digital technologies. Thanks to these advances, while on the one hand we have witnessed the increasing development of telecommunication, enabling the user to take advantage of health services through remote communication [20], on the other hand there have been significant advances in medical and technological studies, from the combination of which Telemedicine was born. It guarantees greater continuity of care, better quality of life and savings in terms of health expenditure. This enables simple and immediate doctor-patient communication, reducing outpatient visits as well as offering personalised and effective care management. Women treated with telemedicine feel better cared for through the continuous exchange of information between doctor and patient [21]. With the use of these new tools and technologies, the aim is to achieve a more sustainable management of diabetes

and a more rational and modern approach to remotely managed care. Moreover, it should not be overlooked that the use of such systems allows the concept of patient empowerment to take hold, which is fundamental in the management of chronic diseases, as it enables the patient's active participation in the treatment decision-making process.

CONCLUSIONS

The adoption of new technologies to detect blood glucose has benefits for the patient that positively influence quality of life. The improved control of the disease, linked to increased frequency of glucose monitoring, allows the reduction of glycosylated haemoglobin levels, thus achieving improved glycometabolic control. The study showed that there was a statistically significant difference in glycosylated haemoglobins between the two groups (FGM and SMGB). Glycosylated haemoglobin provides a good indication of the amount of glucose present in the blood over the past few months and is therefore a valid test for diagnosing and monitoring diabetes and, above all, diabetes management. The use of the FGM system, as confirmed by the study, allows the improvement of the quality of life of people with diabetes mellitus as well as better management of the disease. Reducing morbidity and mortality and improving the quality of life of people with diabetes mellitus is one of the current challenges for healthcare professionals.

LIMITATIONS OF THE STUDY

Although the study conducted confirmed what is already widely found in the literature, it is not without its limitations. The limitations of the study are related to the way the questionnaire was administered and the choice of sampling, which was carried out according to a non-probabilistic method that does not give all units of the population the same probability of being part of the sample. Indeed, convenience sampling was chosen for data collection. With convenience sampling, patients are not recruited randomly, so the resulting sample is subject to bias. Further limitations are

represented by the sample size, which is especially useful to allow generalisation of the results, and the administration of the questionnaire to paediatric patients and young adults up to 18 years of age. For this class of patients, 8 were aged < 18 years (9.8 % of the sample), 3 were aged < 10 years (3.7 % of the sample). It is likely that the answer to the questionnaire was provided by the parent, who therefore has a system of perception of the problem that is not the patient's own. A further study with a larger sample size would be needed to demonstrate the statistically significant reduction between perceptions of hypoglycaemic and hyperglycaemic episodes in subjects using the FGM system compared to those using the SMGB.

FUNDING

The authors did not receive any external funding to support this research.

AUTHORS' CONTRIBUTION

All the authors contributed to the same extent to the realisation of the research.

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

LEGEND ACRONYMS AND ABBREVIATIONS

ADA = American Diabetes Association; DMT1 = Type 1 Diabetes Mellitus; DMT2 = Type 2 Diabetes Mellitus; DTSQ = Diabetes Treatment Satisfaction Questionnaire; FGM = Flash Glucose Monitoring; HbA1c = Glycosylated Hemoglobin; CI = Confidence Interval; IDF = International Diabetes Federation; IQR= Interquartile Scrap; SMBG = Self-monitoring of Blood Glucose; SSN = National Health Service

REFERENCES

1. American Diabetes Association. Diagnosis and classification of diabetes mellitus. *Diabetes Care* 2014; 37(Suppl. 1): (S81–S90)2, 1993.
2. Leslie RDG. Causes of diabetes. Genetic and environmental factors. Wiley & Sons, Chicester, 1993.
3. Dianna J. Magliano, Edward J. Boyko. IDF Diabetes Atlas 10th edition scientific committee. Brussels: International Diabetes Federation; 2021.
4. Gabriel A Gregory, Thomas I G Robinson, Sarah E Linklater, Fei Wang, Stephen Colagiuri, Carine de Beaufort et al. Global incidence, prevalence, and mortality of type 1 diabetes in 2021 with projection to 2040: a modelling study. *Lancet Diabetes Endocrinol.* 2022 Oct; 10(10):741-760.
5. Lo Scalzo A, Abraha I, Bonomo MA, Chiarolla E, Migliore A, Paone S et al. Flash Continuous Glucose Monitoring Systems - Rapid HTA report for diabetes subjects in insulin therapy. Agenas: Rome, 2018.
6. Fox C, Kilvert A. Il diabete di tipo 2. Tutte le risposte a portata di mano. Versione italiana a cura di Edoardo Mannucci e Caterina Lamanna. Ercules Comunicazioni, 2012.
7. American Diabetes Association (ADA). Standards of Medical Care in Diabetes. *Diabetes Care* 2018; 41, Suppl. 1, 2018.
8. ADA. Implication of Diabetes Control and Complication Trial. *Diabetes Care*, 2004.
9. Wenqi Fan, Haipeng Pang, Zhiguo Xie, Gan Huang, and Zhiguang Zhou. Circular RNAs in diabetes mellitus and its complications. *Front Endocrinol (Lausanne).* 2022; 13: 885650.
10. Mariarosaria De Luca, Michele Modestino, Olimpia Iacono, Anna De Simone, Vincenzo Guardasole, Angelo Foglia. Advanced hybrid closed-loop: review of the current systems available in Italy for the treatment of type 1 diabetes mellitus. *JAMD* 2022| VOL. 25 | N° 2: 121.

11. Yaron M, Roitman E, Aharon-Hananel G, Landau Z, Ganz T, Yanuv I et al. Effect of Flash Glucose Monitoring Technology on Glycemic Control and Treatment Satisfaction in Patients With Type 2 Diabetes. *Diabetes Care*. 2019 Apr 29.
12. Nicolucci A, R Giorgino, D Cucinotta, G Zoppini, M Muggeo, S Squatrito et al. Validation of the Italian version of the WHO-Well-Being Questionnaire (WHO-WBQ) and the WHO-Diabetes Treatment Satisfaction Questionnaire (WHO-DTSQ). *Diabetes Nutr Metab*. 2004 Aug;17 (4):235-43.
13. Nicolucci A. L'uso dei questionari sulla qualità della vita. *G It Diabetol Metab* ,2006.
14. Timothy C Dunn , Yongjin Xu , Gary Hayter , Ramzi A Ajjan. Real-world flash glucose monitoring patterns and associations between self-monitoring frequency and glycaemic measures: A European analysis of over 60 million glucose tests. *Diabetes Res Clin Pract*. 2018 Mar;137:37-46.
15. Bolinder J, Antuna R, Geelhoed-Duijvestijn P, Kroger J, Weitgasser R. Novel glucose-sensing technology and hypoglycaemia in type 1 diabetes: a multicentre, non-masked, randomised controlled trial. *Lancet*, 2016.
16. Anders L Carlson, Timothy Dilon Daniel, Andrea DeSantis , Serge Jabbour, Esra Karslioglu French , Davida Kruger et al. Flash glucose monitoring in type 2 diabetes managed with basal insulin in the USA: a retrospective real-world chart review study and meta-analysis. *BMJ Open diabetes Res Care*. 2022 Jan; 10(1):e002590.
17. Marianna Yaron, Eytan Roitman, Genya Aharon-Hananel, Zohar Landau, Tali Ganz, Ilan Yanuv et al. Effect of Flash Glucose Monitoring Technology on Glycemic Control and Treatment Satisfaction in Patients With Type 2 Diabetes. *ADA Volume 42, Issue 7*, 2019 July.
18. Reng-Na Yan, Ting-Ting Cai 1, Lan-Lan Jiang 1, Ting Jing 1, Ling Cai , Xiao-Jing Xie et al. Real-Time Flash Glucose Monitoring Had Better Effects on Daily Glycemic Control Compared

- With Retrospective Flash Glucose Monitoring in Patients With Type 2 Diabetes on Premix Insulin Therapy. *Front Endocrinol (Lausanne)*.2022 Feb 10;13:832102.
19. Concetta Irace, Sergio Di Molfetta. Il monitoraggio in continuo della glicemia: stato dell'arte. Aggiornamento in tema di tecnologie. Dicembre 2022| Vol 34.| N° 4.
20. Michael J. Ackerman, Rosemarie Filart, Lawrence P. Burgess, Insup Lee, and Ronald K. Poropatich. Developing Next-Generation Telehealth Tools and Technologies: Patients, Systems, and Data Perspectives. *Telemedicine and e-Health*. Feb 2010. 93-95.
21. Ming W, Lucy H Mackillop, Andrew J Farmer, Lise Loerup, Katy Bartlett, Jonathan C Levy et al. Telemedicine Technologies for Diabetes in Pregnancy: A Systematic Review and Meta-Analysis *J Med Internet Res* 2016; 18 (11):e290.

Workplace Violence Experienced by Nurses in Northern Region Hospitals of Morocco: A Cross-Sectional Study

Safae Ouma^{1,2}, Maria Leyre Lavilla Lerma³, Nabil Benomar³ and Nabila Rouahi^{4,*}

¹ Higher Institute of Nursing Professions and Technical Sciences, ISPITS, Boulevard Abdelkhalag Torres, Route de Martil, 93100, Tetouan, Morocco. safaeouma21@gmail.com

² PhD student, Faculty of Health Sciences, University of Jaen, Campus Las Lagunillas s/n, 23071 Jaén, Spain.

³ Faculty of Health Sciences, University of Jaen, Campus Las Lagunillas s/n, 23071 Jaén, Spain; llavilla@ujaen.es; nben@ujaen.es

⁴ Higher Institute of Nursing Professions and Technical Sciences (ISPITS Annexe Kenitra), Route de Casablanca, 10120, Rabat, Morocco. rouahinbl@gmail.com

* Correspondence : Rouahi Nabila (Rouahi N), Professor at Higher Institute of Nursing Professions and Technical Sciences (ISPITS Annexe Kenitra), Route de Casablanca, 10120, Rabat, Morocco.
e-mail : rouahinbl@gmail.com

Original article

DOI: [10.32549/OPI-NSC-95](https://doi.org/10.32549/OPI-NSC-95)

Submitted: 08 May 2023

Revised: 05 June 2023

Accepted: 06 June 2023

Published online: 13 June 2023

This article is licensed under the Creative Commons Attribution - Non Commercial - No Derivatives 4.0 (CC BY NC ND 4.0) international license.

Abstract

Background: Workplace violence (WPV) perpetrated against health professionals is a major problem in health sector. It affects health and performance of workers. The aims of this study were: 1) to assess WPV facing nurses in the northern region of Morocco and 2) to identify the related factors.

Methods: We conducted a cross-sectional study in the northern region of Morocco from October to December 2021. In total, 391 volunteer nurses working in 13 hospitals were enrolled. A self-reported questionnaire, 'Violent Incident Form' (VIF), was distributed to the participants. It assesses verbal and physical violence.

Results: We obtained 98% response rate and 97% of the respondent nurses faced at least one WPV episode the last year. Verbal violence is the most common type of violence. Significant factors as age of the victims ($\chi^2 = 15.34$; $p = 0.038$) and the assaulters ($\chi^2 = 27.66$; $p < 0.001$), and mental condition of the assaulter ($\chi^2 = 28.27$; $p = 0.003$) were obtained. According to post hoc residual z test, nurses aged between 40 and 49 and over 60 y.o were more exposed to physical violence than other groups, while the aggressors were younger aggressors (19-30 y.o.) and over 60 ; wherears significant less frequent were cases of aggressors aged between 31 and 50 y.o.

Conclusion: A high exposure of nurses to WPV in northern Moroccan hospitals is noted. The significant factors of violence obtained must be considered for the control and prevention of WPV among nurses in Moroccan hospitals.

Keywords: Morocco, nurses; hospital; verbal violence; physical violence; workplace violence; questionnaire

Introduction

The Workplace violence (WPV) is a worldwide problem within the healthcare sector. The effect of this phenomenon on the performance of an organization makes it a serious issue that we should study in all dimensions. The World Health Organization classifies workplace violence into physical and non-physical violence [1]. This publication specifies that these categories of WPV include physical assault, homicide, verbal abuse, bullying/mobbing, sexual/racial harassment, and threatening behavior. The National Institute for Occupational Safety and Health also defines it as a violent act, including physical assaults and threats of assault directed toward persons at work or on duty [2]. Other classifications, based on the relationship between the two parties involved in the incident, are also known [3, 4].

The notified incidence of violence in the health sector constitutes almost a quarter of all the incidents of WPV perpetrated in all the other sectors [5]. Consequently, WPV affects the work demand [6], the quality of healthcare, and the psychological state of the health workers [7].

In health facilities, 52.2% to 87.3% of health workers reported an experience of physical violence during their careers. Many more are threatened or exposed to verbal abuse. Patients and visitors are responsible for a great number of incidents [8]. Pich and Roche [8] confirmed that all the categories of health workers are concerned with WPV, but the highest rate of reported cases is observed among nurses and midwives in both public and private sectors and different geographic areas.

According to Cebrino et al, a worldwide bibliometric analysis reveals that the number of studies on WPV perpetrated against healthcare personnel grew between 1992 and 2019 [9]. Most reported WPV factors include psychological setting, illness of the perpetrators, miscommunication, younger nurse age, and alcohol use [10]. Chapman et al. [11] identified the predicting behaviors that must alert nurses on the occurrence of a WPV incident and then help them manage it. It was found that nurses suffer from WPV approximately two times more than physicians [12]. Despite the growing interest and the high number of studies published on WPV perpetrated against healthcare workers,

this phenomenon is still underestimated. According to Kvas and Seljak, this is due to unreported cases and a large tolerance of WPV among health professionals [13].

In Morocco, non-medical health professionals represent 56% of health human resources; physicians represent 22% and administrates 22% [14]. The first category of health personnel includes Nurses (69%), Midwives (16%), Health technicians such as medical analysis laboratory and imagery personnel (11%), rehabilitation personnel (4%), and social worker (1%). According to the same document, 60% are female gender and 40% are male gender.

The first study conducted in Morocco on WPV in the healthcare sector was published in 2010 [15]. Moroccan healthcare workers are at high risk of exposure to WPV [16]. A report on the Moroccan working environment showed a higher workload and higher stress levels in the workplace [17]. Additionally, the same authors observed the absence of an ergonomic workplace, the non-availability of resources, and the ignorance of consequences of exposure to violence in the Moroccan healthcare sector. The reality is that few data are available and published on WPV in the Moroccan health sector.

For a better control and prevention of this phenomenon, it is important to know the occurrence and the factors associated with WPV perpetrated against nurses in Moroccan hospitals. To intervene and manage these incidents as quickly as possible, nurses need to be able to know and identify factors that can alert them to the possibility that a violent incident may occur [11]. This interest is in line with policies issued by Moroccan Health authorities. Additionally, Moroccan high governmental authorities and health authorities adopted laws and procedures to be applied in the case of any kind of aggression facing health professionals in their workplace. The authorities adopted this strategy during the year 2021.

The study questions are 1) What is the occurrence of the WPV in northern region hospitals of Morocco and 2) What are the factors related to WPV among nurses exposed to WPV in the hospitals of this area. Only 1 study has investigated this phenomenon in Morocco, specifically in

the emergency unit of the national hospital located in Rabat city.

Objectives

The aims of this study were 1) to assess the WPV perpetrated against nurses in hospitals of the northern area of Morocco and 2) to identify the related factors.

Materials and Methods

Study area, study design and tool

We performed a cross-sectional field study. The study was conducted in a geographic area located in the north-west of Morocco (35.2630° N, 5.5617° W). Mediterranean Sea borders this area from the north and the Atlantic Ocean from the west. Rabat-Salé- Kénitra region and Fès-Meknès region border the area from the southeast and the east. A total of 12.5 million of inhabitants live in this area. The estimated number of non-medical health professionals working in the hospitals of this area was 1749.

To achieve the aims of our study, we adopted a self-reported questionnaire, Violent Incident Form (VIF). This questionnaire was initially developed by Arnetz [18], and used after that in several WPV survey studies [7, 19, 20]. The VIF assesses verbal violence and physical violence (spitting, biting, kicking, scratching/pinching, slapping/hitting punching, pushing, restraining, use of object or weapon, others). It reports also the circumstances, perpetrator, reactions and consequences of the violence. The questionnaire consists of 18 questions with binary (Yes/No) or multiple-choice responses. One section describes the characteristics of the victim and the aggressor. The other section describes the related factors of WPV experienced by nurses over the preceding 12 months.

Authorizations and ethical consideration

In accordance with the Declaration of Helsinki, we first obtained the authorization of the Regional

Health Authorities and the approval of the Ethics Committee (protocol code 28/2021). Anonymous identification, data protection, and voluntary participation were ensured. Additionally, all the participants in the study gave their written agreement to participate in the survey by filling out a consent form.

Subjects, sampling, recruitment and data collection procedure

Participants were enrolled according to these inclusion criteria: being nurse and working for at least 2 years in the hospital as full-time worker. We excluded nursing students and nursing trainees. We unexpectedly visited the hospitals of the study area. The procedure to recruit the eligible subjects is the following. We went to each nurse's supervisor in each hospital and asked him to distribute, among the eligible nurses, the pack of supports and tools of this survey. The individual pack contained the VIF questionnaire, along with a cover letter and a consent form. The sample size was estimated by Bernoulli sampling [21], according to the following formula.

$$n = \frac{z_{\alpha}^2 p(1-p)}{\Delta^2}$$

We considered the central value of the prevalence interval as the representative value of the interval, i.e. 70%, IC=95%, Z-score 1.96 and a $\Delta=5\%$. In this way the minimum size was estimated equal to 323 nurses. We expanded the estimated sample up to 379 to reduce any statistical bias, due to any questionnaires not completed or with missing data. In this regard, we distributed 391 questionnaires. We recruited 387 volunteers and consenting nurses. The nurses were asked to describe the most significant WPV incident that they experienced during the 12 months preceding the study, as indicated in the VIF. Among the volunteers, 379 nurses experienced a WPV incident. They completed the questionnaire independently and anonymously. Afterwards, they deposited the completed questionnaires in a sealed box that we previously distributed in each hospital. Then, we

collected the boxes 15 days after. The period of data collection lasted from October to December 2021.

Statistical analysis

We analyzed the data using the package IBM SPSS Statistics for Windows, version 21.0. Armonk, NY: IBM Corporation. Multiple responses were possible on the section of the checklist dealing with type of violence and other variables. The type of violence as dependent variable was categorized into verbal violence, physical violence (spitting, biting, kicking, scratching/pinching, slapping/hitting, punching, pushing, restraining, use of object or weapon) and Both, based on the approach of these authors [22]. Descriptive statistics were conducted to determine the characteristics of the study sample. Data were presented as frequencies and percentages. The multicomparison chi-square test was used to define significant differences among groups. Fisher's exact test was used where the chi-square test was not appropriate. If the statistical test considering all options of responses for an item was positive ($p\text{-value} < 0.05$), then the highest percentage value for an option was compared statistically to the sum of the percentages of all the other options, in order to point out probable triggers of WPV. Additionally, we performed a post hoc multiple chi-square test or multiple Fisher's exact test (if the chi-square test or Fisher's exact test were significant) to identify significantly more or less frequent categories. We applied the 2 tailed residual z test for significant variables. A value higher than +1.96 standard deviations is considered significant. The critical value is the same for each tail. All tests with $p < 0.05$ were considered significant.

Results

Demographic characteristics of the victims and the assaulters

We distributed the questionnaires to 391 nurses working in hospitals located in the study area. In

total, 387 nurses informed the questionnaire with 98% response rate. Among the respondents, 97% of the nurses experienced at least one WPV episode during the preceding year. The demographic characteristics of the assaulted nurses and the assaulters are illustrated in Table 1.

Parameter	Frequencies	Percentages (%)
Data on victims		
Gender		
Males	150	40
Females	223	60
Total	373	100
MV	6	
Age category*		
≤ 29	146	39
30-39	148	39
40-49	46	12
50-59	28	8
≥ 60	8	2
Total	376	100
MV	3	
Data on assaulters		
Gender		
Males	261	70
Females	113	30
Total	374	100
MV	5	
Age category*		
Under 18	2	0,5
19-30	123	32,5
31-50	211	56
51-65	33	9
Over 65	9	2
Total	378	100
M.V	1	
<i>Note. MV: Missing Value; * Age intervals are those specified in the VIF [18]</i>		

Table 1. Demographic data of victims and WPV perpetrators in hospitals, northern region of Morocco, 2021.

Our data showed that the majority of the nurses (78%) aged less than 39 years old. The sex ratio (Male-to-Female) was 0.7. Most of the victims were females (60%), whereas most of the assaulters were male (70%). The majority of assaulters aged between 31 and 50 years old.

Violence pattern among nurses

The data on the type of violence facing nurses are presented in Table 2. The most common type of violence was verbal violence (70 %). The main forms of physical violence were Slapping/Hitting (29 %) and Kicking (26 %).

Type of WPV	Frequency	Percentages (%)
<i>Verbal violence</i>	271	71.5
<i>Physical violence</i>	38	10
Slapping/hitting	11	29
Kicking	10	26
Pushing	7	18
Restraining	3	8
Scratching/pinching	3	8
Spitting	2	5
Punching	1	3
Biting	1	3
<i>Both</i>	70	18.5
<i>Note. Total percentage may add up to more than 100% as multiple responses were allowed.</i>		

Table 2. Type of WPV facing nurses (n=379) in northern region hospitals of Morocco, 2021.

Profile of the victims and the aggressors

The data on the profile of the victims, aggressors and factors related to WPV are illustrated in Table 3.

Variables	N(%)	Physical violence N(%)	Verbal violence N(%)	Both	Statistical test	p-value
Gender of victims						
<i>Males</i>	150(40)	20 (54)	98(37)	32(46)	C = 5.41	0.067
<i>Females</i>	223(60)	17(46)	169(63)	37(54)		
<i>Total</i>	373(100)	37(100)	267(100)	69(100)		
<i>MV</i>	6					
Age category of victims						
<i>Under 29</i>	146(39)	10(27)	113(42)	23(33)	F = 15.34	0.038*
<i>30-39</i>	148(39)	12(32)	104(39)	32(46)		
<i>40-49</i>	46(12)	10(27)	28(10)	8(11)		
<i>50-59</i>	28(8)	2(7)	20(7)	6(9)		
<i>Over 60</i>	8(2)	3(8)	4(2)	1(1)		
<i>Total</i>	376(100)	37(100)	269(100)	70(100)		
<i>MV</i>	3					
Gender of aggressors						
<i>Males</i>	261(70)	27(71)	188(70)	46(68)	C = 0.19	0.908
<i>Females</i>	113(30)	11(29)	80(30)	22(32)		
<i>Total</i>	374(100)	38(100)	268(100)	68(100)		
<i>MV</i>	5					
Age category of aggressors						
<i>Under 18</i>	2(0,5)	0(0)	2(1)	0(0)	F = 27.62	<0.001*
<i>19-30</i>	123(32.5)	22(59)	80(30)	21(30)		
<i>31-50</i>	211(56)	8(21)	160(59)	43(61)		
<i>51-65</i>	33(9)	4(10)	23(8)	6(9)		
<i>Over 65</i>	9(2)	4(10)	5(2)	0(0)		
<i>Total</i>	378(100)	38(100)	270(100)	70(100)		
<i>MV</i>	1					
Who showed aggression or violence towards you?						
<i>Colleagues</i>	36(9)	0(0)	28(10)	8(11)	F = 28.17	< 0.001*
<i>Patients</i>	154(41)	30(79)	96(36)	28(41)		

<i>Patient relatives</i>	187(50)	8(21)	146(54)	33(48)		
<i>Total</i>	377(100)	38(100)	270(100)	69(100)		
<i>MV</i>	2					
In your estimation, was the aggressor						
<i>Mentally ill</i>	113(30)	24(63)	64(24)	25(36)		
<i>Senile dement/ mentally retarded</i>	48(13)	3(8)	38(14)	7(10)		
<i>Affected by anaesthesia</i>	1(0.3)	0(0)	1(0)	0(0)		
<i>Heavily medicated</i>	15(4)	1(3)	11(4)	3(4)	F = 28.28	0.003*
<i>Under the influence of alcohol</i>	18(4.7)	0(0)	13(5)	5(7)		
<i>Don't know</i>	182(48)	10(26)	142(53)	30(43)		
<i>Total</i>	377(100)	38(100)	269(100)	70(100)		
<i>MV</i>	2					
Time of violent event						
<i>Daily shift</i>	251(68)	25(66)	180(68)	46(70)		
<i>Night shift</i>	116(32)	13(34)	83(32)	20(30)	C = 0.36	0.500
<i>Total</i>	367(100)	38(100)	263(100)	66(100)		
<i>MV</i>	12					
Place of a violent event						
<i>Patient's room</i>	91(24)	16(42)	62(23)	13(19)		
<i>Corridor</i>	129(34)	8(21)	99(36)	22(31)		
<i>Waiting room</i>	54(14)	3(8)	38(14)	13(19)		
<i>Examination room</i>	64(17)	7(18)	41(15)	16(23)		
<i>Outdoors</i>	4(1)	0(0)	3(1)	1(1)	F = 16.01	0.437
<i>Dining area</i>	3(1)	0(0)	3(1)	0(0)		
<i>Day room</i>	7(2)	1(3)	5(2)	1(1)		
<i>Stairway</i>	3(1)	0(0)	3(1)	0(0)		
<i>Other places</i>	24(6)	3(8)	17(6)	4(6)		
<i>Total</i>	379(100)	38(100)	271(100)	70(100)		

Where you working alone when the incident occurred?					
<i>Yes</i>	162(43)	18(48)	115(42)	29(42)	C = 0.40 0.822
<i>No</i>	217(57)	20(52)	156(58)	41(58)	
<i>Total</i>	379(100)	38(100)	271(100)	70(100)	
When did the incident occur?					
<i>At admission</i>	120(32)	8(21)	88(32)	24(35)	F = 9.02 0.526
<i>During hospital stay</i>	172(45)	21(55)	121(45)	30(33)	
<i>At discharge or transfer</i>	36(10)	4(11)	27(10)	5(7)	
<i>Other</i>	50(13)	5(13)	35(13)	10(13)	
<i>Total</i>	377(100)	38(100)	271(100)	69(100)	
<i>MV</i>	1				
Activity that preceded the incident					
<i>Conversation with patients</i>	160(42)	10(26)	122(45)	28(40)	F = 14.96 0.135
<i>Examination/treatment</i>	105(28)	16(42)	65(24)	24(34)	
<i>No clinical activities</i>	27(7)	1(3)	23(9)	3(4)	
<i>Requests from patients</i>	36(10)	5(13)	24(9)	7(10)	
<i>Transfer of patients</i>	38(10)	3(8)	28(10)	7(10)	
<i>Other activities</i>	12(3)	3(8)	8(3)	1(2)	
<i>Total</i>	378(100)	38(100)	270(100)	70(45)	
<i>MV</i>	1				
Did you have a feeling in advance that something was about to happen?					
<i>Yes</i>	114(30)	14(37)	80(30)	29(30)	C = 0.92 0.630
<i>No</i>	264(70)	24(63)	190(70)	50(70)	
<i>Total</i>	378(100)	38(100)	270 (100)	70(100)	
<i>MV</i>	1				
Reactions to WPV					
<i>Handled the situation my self</i>	185(49)	25(66)	126(47)	34(49)	

<i>Called for help</i>	109(29)	3(8)	87(32)	19(28)	C = 17.25	0.008*
<i>Other(s) came to assist</i>	71(19)	6(16)	50(18)	15(22)		
<i>No action necessary</i>	12(3)	4(10)	7(3)	1(1)		
<i>Total</i>	377(100)	38(100)	270(100)	69(100)		
<i>MV</i>	2					
Reporting of violent event						
<i>No report</i>	214(57)	18(47)	165(61)	31(44)	C = 14.88	0.005*
<i>Report</i>	165(43)	20(53)	106(39)	39(56)		
<i>-Police report</i>	84	5	58	21		
<i>-Work injury report</i>	81	15	48	18		
<i>Total</i>	379(100)	38(100)	271(100)	70(100)		

Note. MV: missing value. Reference. * = significant test, C = Chi-square test, F= Fisher's exact test

Table 3. Circumstances and factors associated with violence using VIF questionnaire among nurses, Morocco, 2021.

The data on the post hoc statistics, based on 2 tailed residual z test for significant variables previously obtained using Chi-square or Fisher tests, are reported in Table 4.

Considering the profile of the victims, our results indicated that nurses having less than 39 years old were significantly more exposed to WPV than the elders ($\chi^2 = 15.34$; $p = 0.038$). Focusing on 40-49 and 60 or older age groups of the victims, the standardized residuals are significant for physical violence. This finding suggests a significant positive association between 40-49 ($z = 2.6$) and 60-older age groups ($z = 2.5$) and the physical violence.

Regarding the aggressors, we found that males perpetrate more violence than females. Nevertheless, this result was not statistically significant. We observed that the age category of the aggressor was significantly associated with violence ($\chi^2 = 27.66$; $p < 0.001$). The aggressors belonging to 31-50 years old age category perpetrated more WPV than other age categories. Comparing this age category to the others, we found that this interval can be considered as a trigger of WPV ($p <$

0.001).

Variables	Verbal Violence	Physical Violence	Both Types of Violence
<i>Age category of victims</i>			
<i>Under 29</i>	0.8	-1.2	-0.8
<i>30-39</i>	-0.2	-0.7	0.8
<i>40-49</i>	-0.9	2.6*	-0.2
<i>50-59</i>	0	-0.5	0.3
<i>Over 60</i>	-0.7	2.5*	-0.4
<i>Age category of aggressors</i>			
<i>Under 18</i>	0.5	-0.4	-0.6
<i>19-30</i>	-0.8	2.7*	-0.4
<i>31-50</i>	0.8	-2.9*	0.6
<i>51-65</i>	-0.1	0.4	0
<i>Over 65</i>	-0.6	3.3*	-1.3
<i>Who showed aggression or violence towards you?</i>			
<i>Colleagues</i>	0.4	-1.9	0.5
<i>Patients</i>	-1.4	3.7*	0
<i>Patient relatives</i>	1.0	-2.5*	-0.2
<i>In your estimation, was the aggressor</i>			
<i>Mentally ill</i>	-1.9	3.7*	0.9
<i>Senile/dement/mentally retarded</i>	0.6	-0.8	-0.6
<i>Affected by anaesthesia or Heavily medicated</i>	0	0	0
<i>Under the influence of alcohol</i>	0	-1.3	0.9
<i>Don't know</i>	0	-1.9	0

<i>Reactions to WPV</i>			
<i>Handled the situation my self</i>	-0.6	1.5	0
<i>Called for help</i>	0	-2.4*	0
<i>Other(s) came to assist</i>	0	0	0
<i>No action necessary</i>	0	2.5*	0
<i>Reporting of violent event</i>			
No report	1.0	-0.7	-1.4
Report	-1.1	0.8	1.5

Table 4. Post hoc statistics, based on 2 tailed residual z test applied to significant risk factors of WPV experienced by nurses, Morocco 2021. Significant z values were marked with an asterisk.

Additionally, post hoc statistics based on residual standardized z test, were significant for 19-30 and over 65 age groups of the aggressors ($z = 2.7$ and $z = 3.3$ respectively) for physical violence. This result indicates a significant positive association between these age group and physical violence. At the opposite, we obtained a significant negative association between 31-50 age group and physical violence ($z = -2.9$).

With regards to the nature of the relationship between the parties involved in the incident, the data showed that this factor was strongly and significantly associated with violence ($\chi^2 = 28.17$; $p < 0.001$). The most frequently notified profile of the aggressor was the patient's relatives (50%). Comparing this profile of the perpetrator to the others, we found that patient's relatives is probably a trigger of WPV ($p = 0.001$). Moreover, according to post hoc statistics based on residual standardized z test, we obtained that the profile 'Patients' was positively associated with physical violence ($z = 3.7$) and 'Patients relatives' profile was negatively associated with physical violence ($z = -2.5$).

Considering the emotional and psychological state of the aggressor, it was significantly associated with violence ($\chi^2 = 28.28$; $p = 0.003$). Comparing the state of the aggressor 'Mentally ill' to the other states, we found that the mentally ill aggressor can be considered as a significant alerting

factor of violence ($p = 0.006$). On the other hand, the standardized residual z test indicated that 'Mentally ill' aggressor's state is positively associated with physical violence ($z = 3.7$). This finding suggest that mentally ill aggressors are more likely authors of physical violence than the aggressors with other mental and psychological disorders.

Circumstances and factors associated with WPV

Considering the circumstances of the violence, the time of violent incidents was not significantly associated with WPV. Nevertheless, we observed that aggressive episodes occurred with a high frequency throughout daily shift (68%). About the place of WPV occurrence, the corridors were the most frequently signalized place (34%) than other places. However, the result was not statistically significant. Regarding the situation if the victim was working alone or not, the frequency of violence was slightly high (57%) when the victim was not working alone.

Looking for which step during the patient journey the incidents occur mainly, we observed that most of the events occurred during the hospital stay (45%) and at admission (32 %). Nevertheless, the results were not statistically significant.

Considering the activities preceding the incident, we found that 'Conversation with the patient' was the most frequent (42%), followed by 'Examination/treatment' (28%).

Prediction, reactions and management of workplace violence

Considering the feeling in advance that something was about to happen, most of the victims (70%) responded by No. This result indicates that the great majority of the nurses were not able to identify suspicious behaviors.

Regarding the reactions to WPV, half of the victims opted for handling the situation themselves and this result was statistically significant ($\chi^2 = 17.96$; $p = 0.008$). Comparing the option 'Handled the situation my self' to all the other options, we found that this option is a probable trigger of WPV

($p = 0.088$). Post hoc residual statistics showed a negative association of the option 'Call for help' with physical violence ($z = -2.4$). About the option 'No action necessary', residual statistics showed a positive association with physical violence. In general, the results on the reactivity of the nurses express a non-responsiveness.

Our data showed a low reporting level of the violence occurring in Moroccan hospitals. We observed that 57% of the nurses did not formally report the violence in a police report or a work injury report. This result was statistically significant ($\chi^2 = 14.9$; $p = 0.005$). Finally, Data indicates that the most frequent negative effect of WPV on the nurses was the psychological problem (74%).

Discussion

In this study, we have explored the occurrence of workplace violence among nurses and the associated factors in northern region hospitals of Morocco. It presents the first data on occupational violence facing nurses in Morocco to our knowledge. We obtained a high exposure to WPV among nurses working in this area. This finding was similar to the data reported in these studies [6, 11, 23-28]. Moreover, comparing the WPV frequency between different studies is difficult [6, 20, 23]. This difficulty may be due to the different case definition of different categories of violence adopted by the authors, the use of different tools, and the application of different study designs. In addition, individual differences in perception of violence forms can lead to different results. Overall, verbal violence was more frequent than physical violence. In addition, Arnetz et al report that the violence pattern facing healthcare professionals is different between different health units providing different kind of healthcare [18].

Profile of the victims and the aggressors

Focusing on the age of the victims, we observed that younger nurses, i.e., under 39 years old, faced more workplace violence than elderly nurses. This finding is consistent with the literature [10, 29,

30]. We suggest the insertion of a training module on the management and prevention of WPV in the nursing academic course and the first years after employment in Moroccan health facilities.

Considering the gender of the aggressors, despite the fact that this factor was not statistically significant, but the proportion of male aggressors was very high (70%) compared to females (30%). This item was reported as a factor of violence in these studies [19, 31, 32]. Regarding the assaulter's age, we found that it was a statistically significant factor of violence. This finding is consistent with the last cited studies.

The significantly most incriminated assaulters were the patients' relatives. This result is supported by these studies [24, 26, 28, 32-35]. This finding may be linked to the fact that patients and their relatives have high expectations of healthcare professionals, and when they perceive that their needs are not satisfied, they may adopt aggressive attitudes [3, 36]. According to post hoc residual z test, significant statistics showed that nurses aged between 40 and 49 and over 60 y.o were more exposed to physical violence than other age categories, while the aggressors aged between (19-30 y.o.) and over 60. In addition, significant less frequent were cases of aggressors aged between 31 and 50 y.o. These victims and aggressors age categories must be considered by the healthcare professionals in the management and the control of WPV.

Circumstances and factors associated with WPV

Despite the fact that our findings were not statistically significant, most of the incidents occurred during daily shifts. This finding is in accordance with these studies [37, 38]. Other authors obtained contradictory data [28, 32].

About WPV place, the most frequently signalized place was the corridors (35%). These data are consistent with these studies [29, 10]. The fact that the results on the circumstances were not statistically significant may be linked to the great number of the response options, the reduced number of the participants in each response option, and the limited sample size.

Prediction, reactions and management of workplace violence

Considering the feeling in advance that an incident will occur, the majority of the incidents were not expected by the nurses. This result is in accordance with the data found in the literature on the predictive factors of WPV [39]. This finding expresses a need to sensitize and inform the nurses about workplace violence. Regarding the consequences of WPV, the most negative effect was psychological problems. This result is in line with the findings of the previously cited study.

Beside this result, we obtained a low reporting of the violent incidents. This finding is in accordance with the results obtained by these authors [40, 41]. It is probably due to the lack of a notification system of WPV, the lack of information on how to report the incident, the ignorance of labor laws and rights, and the victims may believe that the reporting is useless or the act of violence is not considered a crime.

Conclusions

A high exposure of nurses to WPV in northern Moroccan hospitals is noted. Verbal violence is more predominant than physical violence. Considering the profile of the assaulters, the majority are male and the most incriminated are the patients' families. Significant risk factors such as age of the victims and the assaulters were obtained. The mental condition of the assaulter is significantly associated to violence perpetrated against nurses. These results should alert policymakers about the violent workplace incidents committed in Moroccan hospitals. We recommend the conduction of large-scale studies to inform policymakers about the exact magnitude and factors of WPV in other hospitals and non-hospital settings in all regions of the kingdom. Then the implementation of a program on the prevention and management of WPV for nurses and other categories of healthcare professionals. Another preventive aspect is the setting of a WPV notification system in hospitals to help operative managers on time to address the factors that lead to workplace violence.

Limitations

Despite the fact that most of our findings are supported by the data published on workplace violence, our study has some limitations. The main limitation is that VIF asks about violence experienced the past year only. Another limitation about the severity of the violence is related to the fact that the VIF reports if the participant experienced a violent event or not, but the participant is not asked about how often he faced incidents during the year. Finally, since our study was conducted in the northern area only, our findings are not generalized to the whole population of nurses working in Moroccan hospitals or other healthcare facilities. In order to have representative results on the violence through all the country, further studies must be extended to a larger period of time and cover all the regions of Morocco.

Funding: This research received no external funding.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board (or Ethics Committee) of “Comithé d’Ethique pour la Recherche Biomédicale CERBO (protocol code 28/2021 and date of 11/10/2021).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study. Written informed consent has been obtained from the patient(s) to publish this paper.

Data Availability Statement: Data is unavailable due to privacy and national restrictions.

Conflicts of Interest: The authors declare no conflict of interest.

Author Contributions: Conceptualization, S.O (Safae Ouma); N.B (Nabil Benomar) and N.R (Nabila Rouahi); Methods, S.O; N.B and N.R; Software, S.O and N.R; Validation, S.O; N.B; M.L.LL (Maria LeyreLavilla Lerma) and N.R; Formal analysis: MLLL; Investigation, S.O; Resources, S.O; N.B and N.R; Data curation, S.O; N.R and N.R; Writing—Original draft preparation, S.O and N.R; Writing—review and editing, S.O; N.B; MLLL and N.R; Visualization, S.O; N.B; MLLL and N.R; Supervision, N.B and N.R; Project administration, N.B and N.R; Funding acquisition, None. All authors have read and agreed to the published version of the manuscript.

Acknowledgments: We would like to thank the nurses who participated in this research and staff of the hospitals who facilitated the fluent conduction of the study for their efforts in the data collection.

References

1. Krug, E. G., Dahlberg, L. L., Mercy, J. A., Zwi, A. B., Lozano, R. (2002). World report on violence and health. World Health organization. <https://apps.who.int/iris/handle/10665/42495>.
2. National Institute for Occupational Safety and Health. (2002). Violence : Occupational hazards in hospitals. <http://doi.org/10.26616/NIOSH PUB2002101>.
3. Phillips, J. P. (2016). Workplace Violence against Health Care Workers in the United States. New England Journal of Medicine, 374(17), 1661-1669. <https://doi.org/10.1056/NEJMra1501998>.
4. Wassell, J. T. (2009). Workplace violence intervention effectiveness : A systematic literature review. Safety Science, 47(8), 1049-1055. <https://doi.org/10.1016/j.ssci.2008.12.001>.
5. Tuncel, E. K., Dundar, C., Sunter, A. T., Canbaz, S., & Peksen, Y. (2009). Violence towards primary healthcare workers in Samsun, Turkey. 18. Conference: 12th World Congress on Public Health World Health Organization
6. Park, M., Cho, S.-H., & Hong, H.-J. (2015). Prevalence and Perpetrators of Workplace Violence by Nursing Unit and the Relationship Between Violence and the Perceived Work Environment : Workplace violence against nurses. Journal of Nursing Scholarship, 47(1), 87-95. <https://doi.org/10.1111/jnu.12112>.
7. Khalil, M., & Alameddine, M. (2020). Recruitment and retention strategies, policies, and their barriers : A narrative review in the Eastern Mediterranean Region. Health Science Reports, 3(4). <https://doi.org/10.1002/hsr2.192>.
8. Pich, J., & Roche, M. (2020). Violence on the Job: The Experiences of Nurses and Midwives with Violence from Patients and Their Friends and Relatives. Healthcare, 8(4). 522. <http://doi.org/10.3390/healthcare8040522>.

9. Cebrino, J., &Portero de la Cruz, S. (2020). A worldwide bibliometric analysis of published literature on workplace violence in healthcare personnel. PLOS ONE, 15(11), e0242781. <https://doi.org/10.1371/journal.pone.0242781>.
10. Kamchuchat, C., Chongsuvivatwong, V., Oncheunjit, S., Yip, T. W., &Sangthong, R. (2008). Workplace Violence Directed at Nursing Staff at a General Hospital in Southern Thailand. Journal of Occupational Health, 50(2), 201-207. <https://doi.org/10.1539/joh.O7001>.
11. Chapman R, Perry L, Styles I, Combs S. Predicting patient aggression against nurses in all hospital areas. British Journal o Nursing. 2009. 18(8) : 476 – 483.
12. Partridge, B.; Affleck, J. Verbal abuse and physical assault in the emergency department: Rates of violence, perceptions of safety, and attitudes towards security. Australas. Emerg. Nurs. J. **2017**, 20, 139–145. [CrossRef]
13. Kvas, A., & Seljak, J. (2014). Unreported workplace violence in nursing: Unreported workplace violence in nursing. International NursingReview, 61(3), 344-351. <https://doi.org/10.1111/inr.12106>.
14. Human Resources report of the Ministry of Health, 2016.
15. Belayachi, J., Berrechid, K., Amlaiky, F., Zekraoui, A., &Abouqal, R. (2010). Violence toward physicians in emergency departments of Morocco : Prevalence, predictive factors, and psychological impact. Journal of Occupational Medicine and Toxicology, 5(1), 27. <https://doi.org/10.1186/1745-6673-5-27>.
16. Giurgiu DL., Jeoffrion C., Roland-Lévy C, Grasset B., Brigitte Dessomme BK., Moret L., Roquelaure Y., Caubet A., Verger C., El Houssine Laraqui C., Lombrai Pl., Geraut C, and Tripodi D. 2016. Wellbeing and occupational risk perception among health care workers: a multicenter study in Morocco and France. J.Occup Med Toxicol. 2016; 11: 20. <http://doi.org/10.1186/s12995-016-0110-0>.

17. Semlali H. (2010). The Morocco Country Case Study: Positive Practice Environments.
Morocco Case Study: Health Care Environments in Morocco. Global Health Workforce Alliance, WHO, Geneva.
<http://www.who.int/workforcealliance/knowledge/resources/ppemorocco/en/index.html>
18. Arnetz JE, Arnetz BB, Söderman E. Violence toward health care workers. Prevalence and incidence at a large, regional hospital in Sweden. *AAOHN J.* 1998 Mar;46(3):107-14. PMID: 9582726.
19. Ferri, P., Silvestri, M., Artoni, C., & Di Lorenzo, R. (2016). Workplace violence in different settings and among various health professionals in an Italian general hospital : A cross-sectional study. *Psychology Research and Behavior Management*, 9, 263-275.
<https://doi.org/10.2147/PRBM.S114870>.
20. Magnavita, N., &Heponiemi, T. (2012). Violence towards health care workers in a Public Health Care Facility in Italy: A repeated cross-sectional study. *BMC Health Services Research*, 12(1), 108. <https://doi.org/10.1186/1472-6963-12-108>.
21. Strand, M. M., Estimation of a population total under a “Bernoulli sampling” procedure. *The American Statistician*, 1979. 33(2), 81-84.
22. Khalid GM, Idris UI, Jatau AI, Wada YH, Adamu Y, Ungogo MA. Assessment of occupational violence towards pharmacists at practice settings in Nigeria. *Pharmacy Practice*. 2020 Oct-Dec;18(4):2080. <https://doi.org/10.18549/PharmPract.2020.4.20>.
23. Ayranci, U., Yenilmez, C., Balci, Y., &Kaptanoglu, C. (2006). Identification of Violence in Turkish Health Care Settings. *Journal of Interpersonal Violence*, 21(2), 276-296.
<https://doi.org/10.1177/0886260505282565>.
24. Kitaneh, M., &Hamdan, M. (2012). Workplace violence against physicians and nurses in Palestinian public hospitals : A cross-sectional study. *BMC Health Services Research*, 12(1), 469. <https://doi.org/10.1186/1472-6963-12-469>.

25. Alsaleem, S., Alsabaani, A., Alamri, R., Hadi, R., Alkhayri, M., Badawi, K., Badawi, A., Alshehri, A., & Al-Bishi, A. (2018). Violence towards healthcare workers : A study conducted in Abha City, Saudi Arabia. *Journal of Family & Community Medicine*, 25, 188-193. https://doi.org/10.4103/jfcm.JFCM_170_17.
26. Hamdan, M., & Abu Hamra, A. (2015). Workplace violence towards workers in the emergency departments of Palestinian hospitals : A cross-sectional study. *Human Resources for Health*, 13(1), 28. <https://doi.org/10.1186/s12960-015-0018-2>.
27. Rafeea, F., AlAnsari, A., Musbah Abbas, E., Elmusharaf, K & Abu Zeid, M. (2017). Violence toward health workers in Bahrain Defense Force Royal Medical Services' emergency department. *Open Access Emergency Medicine*, 9, 113-121. <https://doi.org/10.2147/OAEM.S147982>.
28. Zafar, W., Siddiqui, E., Ejaz, K., Shehzad, M. U., Khan, U. R., Jamali, S., & Razzak, J. A. (2013). Health Care Personnel and Workplace Violence in the Emergency Departments of a Volatile Metropolis : Results from Karachi, Pakistan. *The Journal of Emergency Medicine*, 45(5), 761-772. <https://doi.org/10.1016/j.jemermed.2013.04.049>.
29. Adib, S. M., Al-Shatti, A. K., Kamal, S., El-Gerges, N., & Al-Raqem, M. (2002). Violence against nurses in healthcare facilities in Kuwait. *International Journal of Nursing Studies*, 39(4), 469-478. [https://doi.org/10.1016/S0020-7489\(01\)00050-5](https://doi.org/10.1016/S0020-7489(01)00050-5).
30. Alameddine, M., Mourad, Y., & Dimassi, H. (2015). A National Study on Nurses' Exposure to Occupational Violence in Lebanon : Prevalence, Consequences and Associated Factors. *PLOS ONE*, 10(9), e0137105. <https://doi.org/10.1371/journal.pone.0137105>.
31. Gerberich, S. G. (2004). An epidemiological study of the magnitude and consequences of work related violence : The Minnesota Nurses' Study. *Occupational and Environmental Medicine*, 61(6), 495-503. <https://doi.org/10.1136/oem.2003.007294>.

32. Lei, Z., Yan, S., Jiang, H., Feng, J., Han, S., Herath, C., Shen, X., Min, R., Lv, C., & Gan, Y. (2022). Prevalence and Risk Factors of Workplace Violence Against Emergency Department Nurses in China. *International Journal of Public Health*, 67, 1604912. <https://doi.org/10.3389/ijph.2022.1604912>.
33. Algaiz, W. M. (2012). Violence exposure among health care professionals in Saudi public hospitals. *Saudi Med J*. 2012. 7.
34. Muñoz del Carpio-Toia, A., Begazo Muñoz del Carpio, L., Mayta-Tristan, P., Alarcón-Yaquetto, D. E., & Málaga, G. (2021). Workplace Violence Against Physicians Treating COVID-19 Patients in Peru : A Cross-Sectional Study. *The Joint Commission Journal on Quality and Patient Safety*, 47(10), 637-645. <https://doi.org/10.1016/j.jcjq.2021.06.002>.
35. Sachdeva, S., Jamshed, N., Aggarwal, P., & Kashyap, S. (2019). Perception of workplace violence in the emergency department. *Journal of Emergencies, Trauma, and Shock*, 12(3), 179. https://doi.org/10.4103/JETS.JETS_81_18.
36. Usman, N., Dominic, B., Nwankwo, B., Nmadu, A., Omole, N., & Usman, O. (2022). Violence towards health workers in the workplace : Exploratory findings in secondary healthcare facilities in Kaduna metropolis, Northern Nigeria. *Babcock University Medical Journal*, 5(1). <https://doi.org/10.38029/babcockunivmedj.v5i1.118>.
37. Albashtawy, M., Al-Azzam, M., Rawashda, A., Batiha, A.-M., Bashairah, I., & Sulaiman, M. (2015). Workplace Violence Toward Emergency Department Staff in Jordanian Hospitals : A Cross-Sectional Study. *Journal of Nursing Research*, 23(1), 75-81. <https://doi.org/10.1097/jnr.0000000000000075>.
38. Fernandes, C. M. B., Raboud, J. M., Christenson, J. M., Bouthillette, F., Bullock, L., Ouellet, L., & Moore, C. F. (2002). The effect of an education program on violence in the emergency department. *Annals of Emergency Medicine*, 39(1), 47-55. <https://doi.org/10.1067/mem.2002.121202>.

39. Alshahrani, M., Alfaisal, R., Alshahrani, K., Alotaibi, L., Alghoraibi, H., Alghamdi, E., Almusallam, L., Saffarini, Z., Alessa, S., Alwayel, F., Saffarini, L., Alrawdhan, A., Mapusao, C., Asonto, L. P., Alsulaibikh, A., & Aljumaan, M. (2021). Incidence and prevalence of violence toward health care workers in emergency departments : A multicenter cross-sectional survey. *International Journal of Emergency Medicine*, 14(1), 71. <https://doi.org/10.1186/s12245-021-00394-1>.
40. Garg, R., Garg, N., Sharma, D.K., Gupta, S. (2019). Low reporting of violence against health-care workers in India in spite of high prevalence. *Medical Journal Armed Forces India*. 75. 211-215. doi: 10.1016/j.mjafi.2018.11.011.
41. Alfuhaha O., Albawati N., Alhiary S., Alhalaiqa F., Haha M., Musa S., Shunnar O and AL Thaher Y 5. (2022). Workplace Violence among Healthcare Providers during the COVID-19 Health Emergency: A Cross-Sectional Study. *Behav. Sci.* 2022, 12, 106. <https://doi.org/10.3390/bs12040106>.



17 Settembre
Giornata Mondiale
della Sicurezza
del Paziente



