Special Section

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SOFTWARE DEVELOPMENT FOR THE ASSISTANCE TO BE PROVIDED TO WORKERS AFTER ACCIDENTS INVOLVING BIOLOGICAL MATERIAL

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ABSTRACT

Objective: to develop a prototype web-based software program for managing the assistance to be provided to workers after accidents involving exposure to biological material.
Method: a research study on technological production involving the development of web-based software using the Agile *Scrum* method. It was conceived based on data produced in convergent care research with professionals involved in welcoming and decision-making regarding injured workers. The web-based software prototype underwent evaluation by participant that use the tool and was documented.
Results: the web-based software assists in recording diverse information about accidents involving biological material and provides access to information, easing prompt actions and ensuring safety in procedures, which favors decision-making and the assistance provided to the workers.
Conclusion: workers' health requires technological and managerial investments, with a focus on qualified welcoming and educational management to prevent accidents.

DESCRIPTORS: Technology. Workers' health. Welcoming. Work-related accidents. Nursing.

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DESENVOLVIMENTO DE *SOFTWARE* PARA A ASSISTÊNCIA AO TRABALHADOR APÓS-ACIDENTE COM MATERIAL BIOLÓGICO

RESUMO

Objetivo: desenvolver um protótipo de *web software* para o gerenciamento da assistência ao trabalhador após acidente com exposição a material biológico.
Método: pesquisa de produção tecnológica com o desenvolvimento de um *web software* com utilização do método Ágil *Scrum*. Idealizado a partir de dados produzidos na pesquisa convergente assistencial com profissionais envolvidos no acolhimento e na tomada de decisões frente ao trabalhador acidentado. O protótipo de *web software* passou pela avaliação dos participantes usuários da ferramenta e foi registrado.
Resultados: o *web software* auxilia no registro de informações sobre o acidente com material biológico e proporciona acesso à informação, trazendo agilidade nos encaminhamentos e segurança nas condutas, o que favorece a tomada de decisão e a assistência ao trabalhador.
Conclusão: a saúde do trabalhador requer investimentos tecnológicos e gerenciais, com foco no qualificado acolhimento e gestão educativa para a prevenção dos acidentes.

DESCRITORES: Tecnologia. Saúde do trabalhador. Acolhimento. Acidentes de trabalho. Enfermagem.

DESARROLLO DE UN PROGRAMA DE *SOFTWARE* PARA LA ASISTENCIA PROVISTA A LOS TRABAJADORES DESPUÉS DE UN ACCIDENTE CON MATERIAL BIOLÓGICO

RESUMEN

Objetivo: desarrollar un prototipo de *software web* para gestionar la asistencia provista a los trabajadores después de un accidente con exposición a material biológico.
Método: investigación de producción tecnológica con desarrollo de un programa de *software web* empleando el método Ágil *Scrum*. El trabajo fue concebido a partir de datos producidos en una investigación convergente asistencial con profesionales que participan en la recepción y el proceso de toma de decisiones con respecto a los trabajadores accidentados. Además de ser registrado, el prototipo de programa de *software web* fue sometido a la evaluación de los participantes, que utilizan la herramienta.
Resultados: el programa de *software web* contribuye a registrar diversa información sobre cada accidente con material biológico y proporciona acceso a los datos, aportando agilidad en las derivaciones y seguridad en las acciones, lo que favorece el proceso de toma de decisiones y la asistencia provista a los trabajadores.
Conclusión: la salud de los trabajadores requiere inversiones tecnológicas y gerenciales, enfocadas en una recepción de calidad y en una buena gestión educativa para prevenir accidentes.

DESCRIPTORES: Tecnología. Salud de los trabajadores. Recepción. Accidentes de trabajo. Enfermería.

INTRODUCTION

The past decades have brought about transformations in health care, particularly with the adoption of technology. Keeping up with the increasing amount of health-related knowledge has become a challenge for health professionals and systems[1].

Technologies play a crucial role in easing rapid access to information and providing support in decision-making[2]. In the Nursing profession there is a prominent emphasis on the constant pursuit of technological innovations to enhance work processes. As an integral part of the health field, this profession uses technologies in its daily practice, contributing to the advancement of knowledge and to the provision of care[3].

There are innovations that can be incorporated into the practices of health services and systems[4]. The incorporation of diverse scientific evidence derived from well-grounded studies can provide reliable support to guide the technological innovation process, enhance the visibility of health professions, and improve care quality. When extended to health workers, this care can positively impact health assistance.

In the literature, research studies can be found that relate technologies to workers' health, such as those developed to prevent musculoskeletal risk factors related to Nursing work in hospital units[5], to stimulate adherence to post-exposure prophylaxis for occupational exposure to biological material[6], to mitigate the risk of psychological exhaustion and adverse stress reactions among front-line Covid-19 workers[7], and to guide health professionals on the donning and doffing of Personal Protective Equipment in the pandemic context[8]. Despite these data, there is limited development of interventions targeted at workers[7], especially in relation to work-related accidents involving biological material (WABMs).

The accidents resulting from exposure to biological materials are characterized by direct contact with potentially contaminated fluids, classified as percutaneous exposure instances, such as injuries caused by puncturing and/or cutting instruments, mucosal exposure involving eyes, nose, mouth or genitalia, and cutaneous exposure involving non-intact or intact skin[9]. In Brazil, there were 245,191 reported cases of work-related accidents involving biological material between 2011 and 2015, with Nursing (nursing technicians, nursing assistants and nurses, respectively) as the most affected occupation[10]. Some studies indicate that, among those in the health field, the Nursing category is the most vulnerable to WABMs. This vulnerability is related to the close physical proximity to the patients and to constant handling of materials and equipment with exposure to blood and fluids, associated with the routine and stress inherent to the profession[11–12].

Promoting workers' health is essential by encouraging the practice of healthy habits and implementing measures to prevent work-related accidents. An international research study conducted with Nursing teams identified that workers who perceived unavailability of gloves during work had a double risk of experiencing work-related accidents involving biological material (WABMs), and that those who perceived a higher risk of experiencing an accident were associated with a 60% reduction in the risk[13].

WABMs can increase the risk of acquiring viral infections such as Human Immunodeficiency Virus (HIV), Hepatitis B (HBV) and Hepatitis C (HCV). In order to provide effective assistance to workers after a WABM, it is necessary for the care process to organized and managed, as well as structural and logistical conditions for the first consultation, which includes welcoming the worker, providing rapid test kits for HIV, HVB, HVC and syphilis, prophylactic medications, and assistance in performing exams. Additionally, it is necessary to have professionals with technical-scientific knowledge capable of making immediate decisions related to workers' health, fundamental aspects for care quality to be offered to workers involved in accidents with biological material[14–15].

In a way, using a tool that can guide and assist teams in the assistance provided after a WABM suggests differentiated guidelines and procedures, which can positively impact interventions

and follow-ups. Therefore, to contribute to the field of workers' health, the objective is to develop a prototype web-based software program for managing the assistance provided to workers after a WABM.

METHOD

This is a technological production research study involving the development of a web-based software program and the use of the Agile *Scrum* method. It is a project management method that has been employed in other research studies in the health area[16–17], segmenting a single project into several smaller stages called *Sprints*. By using *Sprints*, the team can develop and make predictable and short-term deliveries, as each member knows what needs to be done within a specified time frame[18].

The "*Scrum* 3-5-3" method was employed, which includes the elements of responsibility, events and artifacts. The team, named "*Scrum* Team" in this study, consisted of an Information Technology Architect (responsible for the Process Master role), a researcher attending a PhD course in Nursing (acting as Product Owner), and an undergraduate Nursing research assistant affiliated with the research group of a public institution, supervised by an academic advisor.

The prototype presented in this document is the product of a thesis approved by the Research Ethics Committee, which was characterized as Convergent Care Research (CCR). It was conducted between October 2021 and April 2022 at a public health institution located in the state of Rio Grande do Sul, operating at full capacity to serve users of the Unified Health System (*Sistema* Único *de Saúde*, SUS). The data collection techniques included documentary research, semi-structured interviews and convergence groups. In the documentary research, 63 work-related accidents were identified over the past five years across different sectors.

For the interview stage, the inclusion criteria for nurses were having worked in the institution for at least six months, having provided assistance to workers after a WABM at least once, and having recorded the incident in the internal work-related accident form (*Comunicação de Acidente de Trabalho*, CAT). For the representatives from support sectors and committees, the inclusion criterion was having worked in the sector for at least six months. The exclusion criterion was being on vacation or leave of any kind during the data collection period. All signed the Free and Informed Consent form. Of the 26 eligible nurses, 11 were excluded (eight had not assisted workers after accidents involving biological material, and three had been employed for less than six months), resulting in 14 nurses eligible to participate in the study. Regarding the representatives from support sectors and committees, all six workers were eligible to take part in the research.

Subsequently, a draw was conducted among the eligible nurses and among the representatives (site *https://www.sorteiogo.com/).* Care was taken to include at least one nurse from each sector and committee to ensure that all were represented. One nurse refused to participate, and the next selected individual was invited to participate.

For the convergence groups, those who participated in the interviews were invited, and they took place between March and April 2022 in the morning, afternoon and evening shifts, to accommodate the participants' availability. There were three meetings, each one lasting a mean of 60 minutes, with varying participation in each session, totaling 16 individuals. This phase allowed reflecting on the context of the assistance provided to workers after a WABM, resulting in the collective restructuring of the institutional flow of WABMs and the updating of institutional documents used in recording.

CCR allowed understanding the challenges faced in the assistance provided after an accident with biological material and the need for alignment in approaches aimed at the injured workers. Therefore, during a convergence group session, challenges were identified and content was selected to comprise the web-based software. This involved a thorough exploration of the researched scenario and close collaboration with the research participants. The participants suggested developing a tool to

improve record-keeping, ease communication between teams, and aid in decision-making regarding the injured workers.

Based on this, the development of a web-software prototype program was defined. Initially, *Sprints* were planed from a list of items – the product "backlog", which was prepared based on the Clinical Protocol and Therapeutic Guidelines for Post-Exposure Prophylaxis (PEP) for the Risk of Infection by HIV, STIs and Viral Hepatites[15]. In addition to that, diverse information coming from the Work-related Accident Form (CAT) and from the Information System for Notifiable Health Problems (*Sistema de Informação de Agravos de Notificação*, SINAN) were used to address issues related to how the accident should be recorded. The PhD student's knowledge as an Occupational Nurse and the synthesis of data from the CCR stages were also considered.

It is worth noting that the software architecture was planned taking into account compliance with the legislation, such as the Personal Data Protection General Law (*Lei Geral de Proteção de Dados Pessoais*, LGPD)[19], in line with the practices of the researched scenario. The software architect made strategic adaptation from the beginning of the development process, in order to ensure compliance with the legal requirements, prioritizing protection and adequate treatment of all the personal information throughout the process. During the development phase, a clear hierarchy was established among the employees working in the health sector, carefully defining the amount of information made available to each of them, ensuring safe data management.

Additionally, extra measures were adopted, including antivirus software, advanced server configurations, network firewalls, application firewalls and intrusion detection systems, in order to enhance the comprehensive safety of the system.

The list of items included the following: access login for the user that will record the WABM; registering the worker that suffered the accident with biological material; developing versatile forms to record the accident, due to updates in the regulations; recording data of the injured person and diverse relevant information about the accident with exposure to biological material; after recording all the information, generating data for the SINAN and CAT; recording the 28-day Post-Exposure Prophylaxis (PEP) for HIV monitoring; recording the monitoring during a 4-6 week period, 12 weeks and 6 months after the accident; having an agenda for the monitoring during the 28 days of PEP for HIV; having an agenda for the monitoring during 4-6 weeks, 12 weeks and 6 months after the accident; sending a reminder/message to the injured worker about the date for collecting laboratory test results; recording the test results; easing communication between the injured worker and the support sectors; and having visual identity for the software that will be remembered any time a work-related accident with biological material occurs.

In each stage of the project (*Sprint)*, the team (*Scrum* Team) was focused on prioritizing the functionalities, ensuring that the product would evolve according to the actual needs of the health professionals and workers involved in the assistance provided after an accident with biological material. It was decided that open-source technologies would be used.

The following step involved choosing the domain name and searching a hosting service that was compatible with the technological architecture that was planned. The *HostGator* hosting service was chosen, after adhering to a payment plan funded by the researcher-PhD student, which also covered the development of the web-based software. Subsequently, the domain name (physical address for the website) was determined, which became known as Program for Monitoring Accidents with Biological Exposure (*Programa de Acompanhamento de Acidentes com Exposição Biológica*, PAB).

Concurrently, *Trello* was used, which is a free project management app that allows data storage in the cloud. A board was set up in it to organize the tasks being worked on and their progress (*Product Backlog* and *Sprint Backlog*). This board included columns for recording the tasks to be performed and

the foreseen execution time. Some authors mention that using health technology that enables data recording and storage can contribute to planning strategic actions aimed at workers' health and safety[20].

For organizing the development process of the PAB web-based software functionalities, during the first month of planning, *Daily Scrum* meetings of the *Scrum* Team were held via *Google Meet*, lasting 15 minutes each.

After this period, the meetings were biweekly and lasted from 30 to 60 minutes each. During these meetings, the tool functionalities were tested, the material developed was reviewed, and the next functionality to be developed was established.

Sprint Review and *Sprint Retrospective* allowed including new requirements, which were added to the task board for development. The PAB web-based software was completed within am 11-month period, achieving all the requirements defined in the product backlog.

It is recommended to test the prototype in the pursuit of continuous product improvement[16]. Therefore, the testing phase of the PAB web-based software involved the research participants and included members of the Multidisciplinary Management Commission from the Plan for Preventing Risks of Accidents with Sharps at the hospital, the study locus, so as to gather contributions for improvements (feedback). In the Agile *Scrum* method, feedback guides the continuous product improvement process[21]. The invitation to the participants was made in person, and seven individuals accepted to participate, four of whom had been involved in previous phases.

Following recommendations[22], the participants were gathered in the hospital auditorium, where the researcher presented a synthesis of the data produced in the convergence groups, indicating the development of a tool to assist in monitoring workers after WABMs and communication between sectors. Subsequently, the PAB web-based software and its functionalities were presented and the participants were asked to use their mobile devices to access the content and simulate recording an accident with exposure to biological material. The login and password to access the system were provided to the participants.

Later on, the participants were asked to access a questionnaire provided on the *Google Forms*® platform to evaluate the tool regarding its purpose, content, relevance, environment, functionality and efficiency, as well as to provide suggestions for a debriefing process. For this stage, an adapted approach based on the recommendations available in the literature was adopted[22]. The participants were invited to share their impressions about using the tool, and the suggestions were considered to enhance the resources.

After the adjustments, the PAB web-based software obtained the Computer Program Registration Certificate, Process No.: BR512023001583-0.

RESULTS

Following the initial version of the prototype, feedback was requested from seven participants regarding their experience with the tool. Most of the participants identified as female at birth, with ages ranging from 29 to 49 years old. Regarding tenure at the institution, the participants' experience varied from 6 months to 11 years. The majority worked in the morning and afternoon shifts and held specializations or MSc degrees.

Regarding design and layout, it was suggested to improve the visualization on mobile devices. Concerning content, it was recommended to add a space for recording witnesses in the field to record the accident and to provide detailed information to fill in the accident description field.

The main potentialities of this tool were also highlighted, such as: assistance in providing care to injured workers; monitoring the 28 days of PEP use; ease to record the accident; and the assistance offered by the web-based software in notifying injured workers about the follow-up dates. This might contribute to reducing treatment abandonment rates due to the potential side effects. Table 1 presents the results expressed in percentage values regarding this feedback collection process.

Table 1 – Feedback data from the participants on the use of the PAB web-based software. Santa Maria/Rio Grande do Sul, Brazil, 2021-2022. (n=7)

Items	TA*	In a suitable way	TI†
Objective			
– Are the web-based software objectives consistent with the practice of assisting workers after accidents involving exposure to biological material?	100	–	–
– Does the web-based software ease understanding of the issues related to WABMs?	100	–	–
– Are the objectives proposed suitable for their effective implementation?	71.4	28.6	–
Content			
– Do the web-based software contents correspond to its objectives?	85.7	14.3	–
– Are the web-based software contents sufficient to achieve the objectives proposed?	71.4	28.6	–
– Are the recommendations regarding WABMs presented by the web-based software correct?	85.7	14.3	–
– Is the wording suitable for the different knowledge levels of the target audience?	85.7	14.3	–
– Do the contents ease understanding the different dimensions of how to plan the assistance to be provided after an accident involving exposure to biological material?	85.7	14.3	–
Relevance			
– Do the contents address key aspects that should be explored in the practice of providing assistance after an accident involving exposure to biological material?	100	–	–
– Are the web-based software contents relevant for workers to identify the flow regarding WABMs?	100	–	–
Environment			
– Is the virtual environment suitable for presenting the content?	85.7	14.3	–
– Is the virtual environment suitable for understanding the theme of WABMs?	85.7	14.3	–
Ergonomics			
– Can the user navigate between screens quickly?	85.7	14.3	–
– Is the data location consistently maintained from one screen to another?	100	–	–
– Are the text and style resources (e.g., underline, bold, italic) appropriately employed?	100	–	–
– Are the controls and commands visually differentiated from the diverse information presented on the screens?	71.4	28.6	–
– Are the selected items for activation highlighted from the others?	100	–	–
Functionality			
– Is the web-based software suitable for the purposes it is intended for?	85.7	14.3	–
– Does the web-based software perform the functions proposed correctly?	85.7	14.3	–
– Does the web-based software enable generating positive outcomes in the context after an accident with exposure to biological material in the hospital environment?	100	–	–
Usability			
– Is the web-based software easy to use?	71.4	28.6	–
– Is it easy to understand the concepts and applications of the web-based software to provide assistance to injured workers?	71.4	28.6	–

Table 1 – Cont.

Items	TA*	In a suitable way	TI†
Usability			
– Does the web-based software enable workers to easily apply the assistance flow regarding WABMs?	85.7	14.3	–
Efficiency			
– Is the response time of the web-based software adequate for workers to access the content available on different screens?	71.4	28.6	–

*TA = Totally Adequate; †TI = Totally Inadequate.

After an analysis and discussion between the researcher-PhD student and the developer regarding the participants' suggestions, it was decided to incorporate them in their entirety into the final version of the PAB web-based software.

The latest version of the web-based software offers a comprehensive set of features to enhance the assistance to be provided after an accident with biological material. For proper functioning, the users should employ the login and password provided by the hospital, with an Internet connection to access https://pabsaude.com.br/auth/login.

After logging in, the functions are presented to the user, who will record the incident through an initial menu (Figure 1). The *Exposição-REGISTRAR* (Exposure-RECORD) option allows detailing data of the injured worker, such as name, email address, date of the incident or how the accident occurred, among other details (screens 3 and 4).

Figure 1 – Screens 1 and 2 (on the left) and 3 and 4 (on the right) of the PAB web-based software with a highlight on the Record option. Santa Maria/Rio Grande do Sul, RS, Brazil.

In the *Exposição-ACOMPANHAMENTO* (Exposure-Monitoring) option (Figure 2), the user can navigate to the Agenda item, which allows accessing dates and forms for monitoring the injured worker. In the *Em Acompanhamento* (In Monitoring) item, the user will find the workers who are being monitored. Finally, the *Concluídos* (Completed) item includes the list of those who have already completed the monitoring.

Figure 2 – Screens 4 and 5 of the PAB web-based software, highlighting the *Acompanhamento* (Monitoring) option. Santa Maria/Rio Grande do Sul, RS, Brazil.

It is possible to record the first follow-up of laboratory tests 30 days after the accident, the second (12 weeks after the accident), and the third (6 months after the accident). There is a monitoring form for the 28-day use of prophylactic medication. The tool allows recording reactions or other occurrences related to use of the medication.

In order to ensure care continuity, the PAB web-based software also automatizes the task of emailing reminders to the injured workers (Figure 3). These reminders are forwarded one day before the foreseen date to undergo the monitoring laboratory tests in the 4-6 week period, and 12 weeks and 6 months after the accident, which encourages workers to complete their follow-up appointments as necessary.

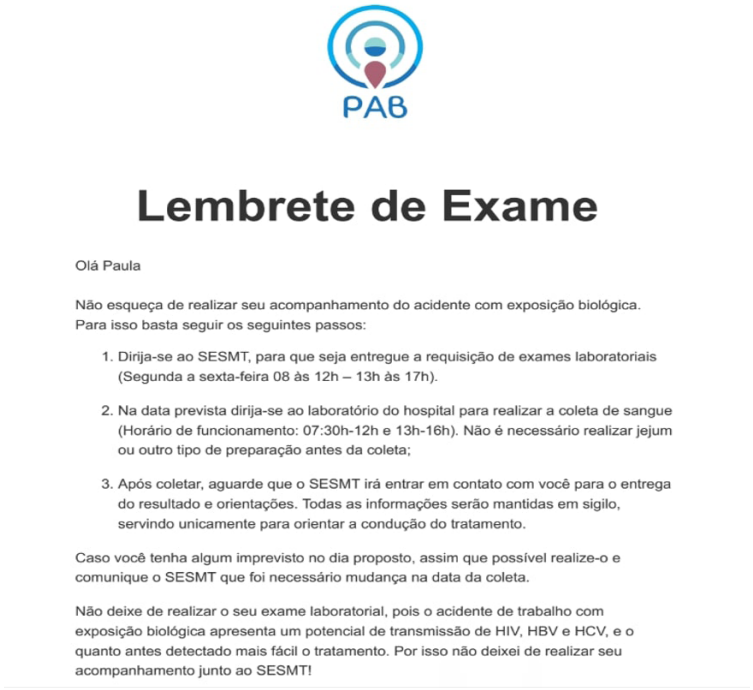

Figure 3 – Screen of the PAB web-based software showing the reminders sent to the injured workers. Santa Maria/Rio Grande do Sul, RS, Brazil.

DISCUSSION

The results showed that the PAB web-based software has the potential to assist in information recording and contribute to the assistance to be provided to workers after a WABM, reflected in welcoming and monitoring, which is consistent with the suggestions identified by the study participants.

The Agile *Scrum* method proved to be a valuable and effective tool in the development of the PAB web-based software, which can contribute to expediting and rendering the accident recording process more accessible, providing access to the information, adding agility and safety to the actions, and favoring decision-making for the injured workers. Applying *Scrum* in the health area is particularly relevant because it is an agile framework that focuses on interdisciplinary collaboration and where needs and regulations can evolve rapidly[23].

It is relevant to mention that nurses' appropriation of the Agile *Scrum* method was an important strategy for the final product to be aligned with the needs identified in the health assistance practice. The development of the PAB web-based software is in line with references from authors who mention that software programs are widely used as health promotion tools in public health[24], consolidating themselves as an innovative area in health care, with a fundamental contribution to effective accessibility to the information[25].

There is a need to incorporate mobile and technological innovations as a sustainable solution to enhance workers' health and safety[26], and emerging technologies are a promise for expanding the reach of well-being programs targeted at health professionals[7], especially in situations of accidents involving biological material in workplace contexts.

Consistent with this, mention is made of a research study conducted at a General Hospital in Singapore, involving front-line nurses and physicians during the Covid-19 pandemic, aiming to assess the functionalities of an app to support the well-being of these professionals. The study concluded that the lack of relationship-building and continuity in program awareness inhibited acceptance and appreciation of face-to-face counseling and psychoemotional education.

Furthermore, many participants showed disfavor towards the artificial intelligence-based chatbot due to loss of human interactivity, which reinforces the finding that insufficient relationship-building led to decreased use of well-being support services among the workers[7].

Another example of technology is the app developed to encourage self-care among health professionals who are victims of occupational exposure to biological material. The tool gathered diverse information on post-exposure protocols and PEP, focusing on antiretroviral medications, their doses and adverse effects. The authors considered that health workers' ability for self-care may interfere with their adherence to post-exposure prophylaxis for occupational exposure to biological material[6].

During the Covid-19 pandemic, access to the information was eased by the increased use of mobile apps by health professionals, such as the one developed to guide those providing home care on the PPE donning and doffing techniques[8].

Some examples illustrate the importance of research as a foundation for innovations in the Nursing and Health fields. There are high global investments in acquiring innovations; however, their effective use depends on the success of their diffusion and evaluation among potential users[27–28].

E-learning offers advantages such as anytime and anywhere access, cost reduction in terms of documentation, and flexibility in actions[29]; however, it is essential to know the context in which the accident took place and the situations prone to transformations to meet the workers' actual needs after an accident. In addition to that, it is necessary to promote workers' awareness regarding biosafety practices, emphasize the prevention of secondary transmissions, and use situations encountered in the work practice as opportunities for educational awareness.

Work-related accidents involving infection risks should be considered emergencies[6]; therefore, immediate reporting of an accident is essential for the development of preventive strategies[16].

In this study, health technology was adopted as the basis for developing a tool aimed at improving the assistance provided to workers after an accident involving biological material. In the CCR context, this approach included the creation of dynamic interactions that promote self-care, such as monitoring the accident by sending reminders to the workers. Consistent with previous research studies, the technological innovation presented can provide a detailed record of the accident, immediate guidelines on actions to be taken, quick access to prophylaxis protocols, effective communication among health professionals, and ongoing monitoring of the workers over time.

Despite its strengths, such as the inclusive process involving participants in creating the tool, the study had limitations in some aspects. The results that influenced the development of the web-based software stemmed from qualitative research, which, by nature, is prone to a certain degree of subjectivity. In addition to that, the evaluation of the software usage will be reported in subsequent studies, as it is understood that continuous assessment of the usability of the PAB web-based software will be a relevant practice to ensure that the technology fulfills its purpose of promoting broader adoption in workers' health contexts.

The results notably indicate actions aimed at health workers' health and safety, as the software provides an interface for both care provision and management, enabling the recording of the care provided.

The PAB web-based software has the potential to support the management of cases of exposure to biological materials, ease the recording of information, promote evidence-based decision-making, and contribute to workers' health. And in the future, its replication in other institutions might be thought about, considering that accidents with biological material are a reality in hospital and health care settings. The product developed holds the potential to streamline processes related to workers' health within hospital settings. Nonetheless, it can also be used in other sectors of society, such as basic health units, dental practices and workers' health surveillance services. The product can be acquired by companies through contacting the researchers directly.

CONCLUSION

The PAB web-based software emerged as a tool resulting from the convergent assistance research movements, conceived from a close relationship between assistance practice and theory. In addition, its development, guided by the Agile *Scrum* method, provided feedback from the participants on the use of the tool.

The web-based software was developed to assist workers after accidents involving biological materials and proved to be suitable for the needs of end users, reflecting the transformative potential of the product as technology in the health area for better management of the care provided to injured workers.

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NOTES

ORIGIN OF THE ARTICLE

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CONTRIBUTION OF AUTHORITY

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CONFLICT OF INTEREST

There is no conflict of interest.

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