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Abstract—Background: **Road traffic accidents (RTA) account for 4.7% of all deaths in the Kingdom of Saudi Arabia (KSA), with rates ranging from 17.4 to 24 per 100,000 people over the past decade. This study aims to enhance community engagement and understanding of bleeding control methods to empower effective responses to bleeding in accident scenarios.**

Method: **This observational cross-sectional study evaluated the knowledge and willingness of the community to engage in bleeding control in the setting of medical emergencies. The study population was comprised of adults in Saudi Arabia who were over the age of 17 at the time of the research.**

Results: **A total of 392 participants took part in the research. Of these, 66.3% (n = 260) were willing to assist a stranger bleeding as a result of a motor vehicle accident. There was no significant gender difference among those with past experiences of assisting someone after an accident. Only 15.5% (n = 61) had certified training, while the majority (77%, n = 47) held bachelor's degrees. Interest in educational workshops on bleeding control was shown by 55.1% (n = 216), with 32% (n = 126) undecided. Regarding tourniquet use, 20.1% (n = 38) believed this to be safe.**

Conclusion: **This study highlighted the community's awareness of bleeding control and readiness to respond to bleeding situations after accidents. While more than half were likely to act, concerns about aggravating injuries, legal issues, and discomfort with blood were significant barriers, underscoring the need for public education and legal protection. Educational status, and particularly a bachelor's degree, was a stronger predictor of the likelihood to intervene than certified training. Significant knowledge gaps were noted with regard to tourniquet use, with few trusting their safety and many incorrectly applying them directly to the wound.**

Index Terms— **Bleeding Control; Mortality; Outcome; Prehospital Trauma; Tourniquet.**

I. INTRODUCTION

Road traffic accidents (RTA) are among the greatest public health challenges and burdens in many countries, Saudi Arabia included [1-5]. Globally, more than 1.2 million people die as a result of RTA, while 50 million are injured [6]. Road deaths in the Kingdom of Saudi Arabia (KSA) account for 4.7% of all deaths, with the number over the past decade increasing from 17.4 to 24 per 100,000 people [1]. Among trauma patients arriving at the emergency department (ED), the main cause of death during the first hour is haemorrhage, which is also responsible for almost half of deaths during the first 24 hours [7]. In trauma patients with active bleeding, control of the bleeding is the most essential intervention [8]. While sufficient and adequate

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bleeding control can increase survival rates [9], inadequate bleeding control can result in metabolic derangement and, eventually, death [8]. As the seriousness of RTA-related injuries can take time to manifest, it is crucial to stop any bleeding within the initial few minutes [10].

A randomised clinical trial compared the haemorrhage control skills (proper/correct use of tourniquet) of people who had received in-person training, those who had received instructional flashcards or audio kits with flashcards, and those without any training (control). It found the skills of those who had received in-person training were superior to the control, while people who received instructional flashcards or audio kits were no superior to the control [11].

While the 'Stop The Bleed' programme has spread worldwide, with 86,8511 participants in 119 countries [12], and the effectiveness of battlefield trauma management techniques in controlling bleeding has been well established by military research [10-11], the general public perception regarding bleeding control and the potential motivators for their willingness to act are unknown. Our aim is to evaluate options for enhancing community engagement and understanding of bleeding control methods, with the goal of empowering people to respond effectively to accidents and contribute to safer communities.

II. METHODOLOGY

This cross-sectional survey was conducted in Saudi Arabia, from February to July 2024, to determine the general public's understanding of bleeding management and its significance. A computerised survey was designed using "Google Forms TM", and the validated questionnaire was translated and evaluated by two expert emergency physicians prior to data collection. Upon approval from the Institutional Review Board (number 24-225), participants were recruited on a voluntary basis and asked to provide informed consent. They were then asked to complete an online questionnaire that was distributed via several social media platforms.

A sample size of 392 was manually selected using "Epi Info TM" [15]. Eligible for inclusion were adult participants in Saudi Arabia who were over 17 years of age at the time of the research. Healthcare providers were included in the study. The questionnaire gathered participants' sociodemographic data (age, gender, occupation, educational status, etc.), their readiness to act in the event of a serious medical emergency, as well as information regarding perceived obstacles, comfort, mindset, and understanding of bleeding control. It also included a brief description of how to stop bleeding and tourniquet placement, and asked about participants' willingness to participate in a future bleeding control campaign. Stata 17.0 software was utilised for data analysis.

III. RESULTS

The total number of participants in the research was 392; **Table 1** illustrates their demographics.

Table 1. Sociodemographic details of participants (n=392)

Variable	Category	Frequency	Percentage (%)
Age	18-30 years	242	61.7
	31-40 years	95	24.2
	41-60 years	42	10.7
	Older than 60 years	13	3.3
Gender	Male	219	55.9

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	Female	173	44.1
Education	Primary school	3	0.8
	Middle school	14	3.6
	High school	85	21.7
	Bachelor	272	69.4
	Postgraduate	18	4.6
Occupation	Student	139	35.5
	Teacher	49	12.5
	Administrator	46	11.7
	Freelancer	13	3.3
	Healthcare provider	39	10.0
	Other	106	27.0

Our study revealed that 66.3% (n=260) of respondents were willing to assist a stranger bleeding on the road following a motor vehicle accident. Further probing on their likelihood to intervene showed a comparable willingness of 60.01% (n=237). When we explored the reasons for hesitation, the predominant concern was fear of exacerbating the injury, cited by 59.44% (n=233) of participants. This was followed by fear of legal repercussions (26%; n=102), discomfort at the sight of blood (9.44%; n=37), and fear of contracting a blood-borne infection (5.1%; n=20). Notably, whether participants had received professional training did not significantly affect their perception of these difficulties (p=0.072), as illustrated in Table 2.

No significant gender differences were observed with regard to past experiences of aiding someone after a motor vehicle accident, or the probability of assisting a bleeding stranger (Fisher's exact p=0.767 and p=0.314, respectively). Only 15.5% (n=61) of respondents reported having certified training, and a majority of these held bachelor's degrees (77%, n=47; Fisher's exact p=0.008). Those without prior training in bleeding control were less likely to have previously helped someone bleeding on the road (Fisher's exact p<0.001).

Table 2. Association of variables with outcomes

Descriptive variables	**p-value**
No statistically significant difference between those who had received professional training and those who had not.	p=0.072
The likelihood of having helped someone after an MVA or the probability of assisting a bleeding stranger does not significantly differ between genders.	p=0.314
Certified training is significantly more common among respondents with bachelor's degrees.	p=0.008
Those without prior training in bleeding control were less likely to have previously helped someone bleeding on the road.	p<0.001

Healthcare providers are more likely to have certified training than those in other occupations.	p<0.005
Individuals lacking formal training are more likely to participate in workshops and training sessions.	p=0.004
Age and gender do not significantly influence the decision to participate in educational workshops and training.	Age: p=0.117 Gender: p=0.163
Individuals with bachelor's degrees are significantly more likely to participant in attending educational workshops on bleeding control.	p<0.005
Knowledge and use of tourniquets	p=NA

Occupational training and willingness to learn:

Among various occupations, a small number of healthcare providers were included in the study, the sample size of which did not affect the end result. These constituted the majority of those with certified training (49.2%, n=30; Fisher's exact p<0.005). Individuals lacking formal training were more inclined to participate in workshops and training sessions (Fisher's exact p=0.004). Interest in joining an educational workshop on bleeding control was expressed by 55.1% (n=216) of respondents, with 32% (n=126) undecided. Neither age nor gender significantly influenced the decision to participate in such workshops (Fisher's exact p=0.117 and p=0.163, respectively), while holders of bachelor's degrees showed the highest interest in attending (72%, n=156; Fisher's exact p<0.005) .

Knowledge and use of tourniquets:

Regarding the use of tourniquets, 20.1% (n=38) of respondents believed tourniquets to be safe. The majority (48.21%, n=189) reported applying the tourniquet directly on the wound, 37.24% (n=146) placed it before the bleeding site, and a minority (4.08%, n=16) placed it below the wound. A smaller group reported positioning it both above and below the wound (10.46%, n=41).

IV. DISCUSSION

The current study sought to assess the awareness and willingness of the community to intervene in bleeding emergencies, particularly following motor vehicle accidents. Many participants expressed a desire to assist individuals with bleeding injuries, illustrating a substantial level of community readiness to respond to such emergencies.

This level of readiness is consistent with similar findings from studies such as Arkoubi et al., which reported 86% willingness among respondents in urban settings to provide first aid in bleeding scenarios [16]. Further exploration into the drivers of willingness to assist revealed that the intentions remain high, with 60.01% of respondents likely to translate their willingness into action. This finding aligns with the theoretical framework of planned behaviour, where intention is a significant predictor of action, as postulated by Ajzen and Sheikh [17]. Prior research by Zhao et al. found a direct correlation between willingness and actual assistance in emergency situations, reinforcing the importance of examining psychological readiness for practical intervention [18].

Nevertheless, our investigation into the hesitations surrounding intervention uncovered several concerns. The primary hesitation was the fear of aggravating the injury (59.44%), underscoring a need for public education on who emphasised the impact of bystander intervention on survival rates [19]. Additionally, legal apprehensions were cited by 26% of participants. This reflects the findings of Hung et al., who expounded the need for Good Samaritan laws to protect bystanders who assist in emergencies, suggesting that legal protection might enhance intervention rates [20]. Discomfort at the sight of blood was another significant deterrent (9.44%), relating closely to the concept of blood-injection-injury phobia discussed by Hung and colleagues, where the aversion to blood can impede

assistance in bleeding emergencies [21]. Moreover, the fear of contracting a blood-borne infection, the least cited concern (5.1%), posed high infection fears as a barrier to emergency assistance [22]. Surprisingly, the presence or absence of professional training did not markedly impact the participants' perception of these obstacles. This suggests that the decision to intervene might be driven more by individual psychological factors and the immediate assessment of the situation, rather than formal training.

Our findings show no significant gender differences in emergency response behaviour, aligning with recent literature suggesting that gender may not be a reliable predictor of emergency intervention. This could challenge traditional perceptions of gender roles within the context of emergency assistance [23]. Contrary to our expectations that certified training would strongly indicate the likelihood of emergency intervention, our data revealed that educational level, and particularly a bachelor's degree, was a more significant factor, as shown by the statistically significant association. These findings suggest that the education system might play a crucial role in shaping individuals' readiness for emergency response, as has been identified in prior studies examining educational impact on health-related behaviours [24]. The low percentage of respondents with certified training (15.5%) indicates a need for policy intervention to improve access to, and incentives for, first aid training. Interestingly, the majority of those trained were bachelor's degree holders. This may reflect the broader trend of higher education institutions including or promoting such training, perhaps due to their resources and networks [22,23]. Moreover, our analysis revealed that respondents without prior training in bleeding control are significantly less likely to have previously assisted someone bleeding on the road. It must be emphasised, however, that our measure of past assistance does not equate to future behaviour. Nonetheless, past behaviour is often used as an indicator of future intentions; a component of the theory of planned behaviour [27].

Our study also sheds light on the readiness of individuals without formal training to improve their skills, with a significant number expressing interest in participating in educational workshops. Such inclination to learn could indicate a broader cultural shift towards proactive health and safety measures. This potential trend is mirrored by other studies that have observed an increase in public interest in first aid and emergency response education [25,26]. The findings of our study regarding tourniquet application reveal substantial variability in knowledge and use thereof, which is a point of concern given the critical role of tourniquets in haemorrhage control. Only a fifth (20.1%) of our participants believed tourniquets to be safe, suggesting a prevailing apprehension or misinformation about their usage. This is a significant finding, considering that previous research by Gardia et al. has shown the effectiveness of tourniquets, if applied correctly, in saving lives in cases of severe limb haemorrhage [30]. However, a majority of respondents reported applying the tourniquet directly on the wound (48.21%), which does not align with generally accepted best practices. As endorsed by trauma guidelines, the correct application of tourniquets involves placing them proximal to the bleeding site—on the limb between the wound and the heart—and not directly over the wound [31]. This misconception underscores a knowledge gap that can severely compromise the outcome of haemorrhage control efforts. A significant proportion of participants indicated that they would place the tourniquet before the bleeding site (37.24%); this aligns with correct tourniquet usage and can effectively stop life-threatening bleeding in extremity wounds [32]. However, the fact that a minority reported placing it below the wound (4.08%) or both above and below the wound (10.46%) further highlights the inconsistency and confusion regarding tourniquet placement.

There are several limitations to this study that

warrant consideration. First, the reliance on self-reported data may have introduced recall bias, as respondents might not accurately remember past events or their actions during emergencies. Second, the study's cross-sectional design limited our ability to assess changes over time and establish causal relationships. The use of a questionnaire also restricted the depth of understanding into the reasons behind individuals' willingness or lack thereof to control bleeding post-accidents, potentially overlooking nuanced factors influencing their responses. Additionally, the sample may not have been representative of the wider population due to the selection bias inherent in who chose to participate, which can affect the generalisability of the findings. Lastly, the study did not account for external factors such as accessibility to training or emergency medical supplies, which could significantly affect awareness and the willingness to act in a bleeding emergency.

V. CONCLUSION

This study evaluated the awareness and readiness of the community to respond to bleeding situations caused by motor vehicle accidents. A high number of respondents said they would likely act, which is consistent with previous research showing strong preparedness. However, anxieties regarding aggravating the injury, legal concerns, and discomfort at the sight of blood were important hurdles, emphasising the need for focused public education and legal protection. Notably, educational level, specifically a bachelor's degree, was a stronger predictor of intervention likelihood than certified training. Few respondents had received formal training, with the majority holding bachelor's degrees. Furthermore, there were significant knowledge gaps regarding tourniquet use, with only some participants believing them safe and many incorrectly applying them directly on the wound. The study's limitations include potential recollection bias, a cross-sectional design that limits causal conclusions, and selection bias, which affects generalisability. Future studies should consider interventions that address these concerns, as well as investigate the efficacy of first-aid education programmes. Overall, our findings highlight the importance of comprehensive public education and policy initiatives to improve community preparedness for emergency bleeding situations.

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VI. REFERENCES

[1] Mansuri FA, Al-Zalabani AH, Zalat MM, et al. Road safety and road traffic accidents in Saudi Arabia. A systematic review of existing evidence. Saudi Med J [Internet]. 2015;36:418–424. Available from: https://pubmed.ncbi.nlm.nih.gov/25828277.

[2] Adeloye D, Thompson JY, Akanbi MA, et al. The burden of road traffic crashes, injuries and deaths in Africa: a systematic review and meta-analysis. Bull World Health Organ [Internet]. 2016/04/21. 2016;94:510-521A. Available from: https://pubmed.ncbi.nlm.nih.gov/27429490.

[3] Karkee R, Lee AH. Epidemiology of road traffic injuries in Nepal, 2001-2013: systematic review and secondary data analysis. BMJ Open [Internet]. 2016;6:e010757–e010757. Available from: https://pubmed.ncbi.nlm.nih.gov/27084283.

[4] Singhal M, Dindi K, Bachani D, et al. Road traffic injuries: Epidemiology, challenges and initiatives in India. Natl Med J India [Internet]. 2019;32:113. Available from: http://dx.doi.org/10.4103/0970-258x.275355.

[5] Izadi N, Najafi F, Khosravi A. The burden of road traffic injuries in Kermanshah Province, Iran, in 2010–2011: GBD 2010 method. Int J Inj Contr Saf Promot [Internet]. 2016;24:435–443. Available from:

http://dx.doi.org/10.1080/17457300.2016.1178300.

[6] WHO Regional Office for Africa. Global Status Report on Road Safety - Time for Action. https://www.afro.who.int/publications/global-status-report-road-safety-time-action.

[7] Catmull SP, Ashurst J V. Autotransfusion. StatPearls. https://www.ncbi.nlm.nih.gov/books/NBK541014/. 2023.

[8] Meléndez-Lugo JJ, Caicedo Y, Guzmán-Rodríguez M, et al. Prehospital Damage Control: The Management of Volume, Temperature… and Bleeding! Colomb Med (Cali) [Internet]. 2020;51:e4024486–e4024486. Available from: https://pubmed.ncbi.nlm.nih.gov/33795898.

[9] Davoodabadi A, Abdorrahim Kashi E, Mohammadzadeh M, et al. Predicting factors and incidence of preventable trauma induced mortality. Ann Med Surg (Lond) [Internet]. 2021;68:102609. Available from: https://pubmed.ncbi.nlm.nih.gov/34381599.

[10] Ramachandra G, Ramana Rao G V, Tetali S, et al. Active bleeding control pilot program in India: Simulation training of the community to stop the bleed and save lives from Road Traffic Injuries. Clin Epidemiol Glob Health [Internet]. 2021;11:100729. Available from: http://dx.doi.org/10.1016/j.cegh.2021.10072.

[11] Goralnick E, Chaudhary MA, McCarty JC, et al. Effectiveness of Instructional Interventions for Hemorrhage Control Readiness for Laypersons in the Public Access and Tourniquet Training Study (PATTS): A Randomized Clinical Trial. JAMA Surg [Internet]. 2018;153:791–799. Available from: https://pubmed.ncbi.nlm.nih.gov/29801156.

[12] Levy MJ, Krohmer J, Goralnick E, et al. A framework for the design and implementation of Stop the Bleed and public access trauma equipment programs. J Am Coll Emerg Physicians Open [Internet]. 2022;3:e12833–e12833. Available from: https://pubmed.ncbi.nlm.nih.gov/36311340.

[13] Butler FK. Two Decades of Saving Lives on the Battlefield: Tactical Combat Casualty Care Turns 20. Mil Med [Internet]. 2017;182:e1563–e1568. Available from: http://dx.doi.org/10.7205/milmed-d-16-00214.

[14] Callaway DW. Translating Tactical Combat Casualty Care Lessons Learned to the High-Threat Civilian Setting: Tactical Emergency Casualty Care and the Hartford Consensus. Wilderness & Environmental Medicine [Internet]. 2017;28:S140–S145. Available from: http://dx.doi.org/10.1016/j.wem.2016.11.008.

[15] Carstensen B, Plummer M, Laara E, et al. Epi: A Package for Statistical Analysis in Epidemiology. R package version 2024. https://CRAN.R-project.org/package=Epi. 2024.

[16] Arkoubi AY, Salati SA, Almughira AI, et al. Awareness, Attitude, and Willingness Toward Bleeding Control by Bystanders in Riyadh. Cureus [Internet]. 2022;14:e30468–e30468. Available from: https://pubmed.ncbi.nlm.nih.gov/36407189.

[17] Ajzen I, Sheikh S. Action versus inaction: anticipated affect in the theory of planned behavior. J Appl Soc Psychol [Internet]. 2013;43:155–162. Available from: http://dx.doi.org/10.1111/j.1559-1816.2012.00989.x.

[18] Zhao Y, Diggs K, Ha D, et al. Participation in emergency preparedness and response: a national survey of pharmacists and pharmacist extenders. J Am Pharm Assoc (2003) [Internet]. 2021/06/08. 2021;61:722-728.e1. Available from: https://pubmed.ncbi.nlm.nih.gov/34148842.

[19] Howe MA, Brewer JD, Shane SD. If Not You, Who? Responding to Emergencies in Physical Education and Physical Activity Settings. Journal of Physical Education, Recreation & Dance [Internet]. 2013;84:47–52.

Available from: http://dx.doi.org/10.1080/07303084.2013.757192.

[20] Hung KKC, Leung CY, Siu A, et al. Good Samaritan Law and bystander cardiopulmonary resuscitation: Cross-sectional study of 1223 first-aid learners in Hong Kong. Hong Kong Journal of Emergency Medicine [Internet]. 2019;28:22–29. Available from: http://dx.doi.org/10.1177/1024907919870928

[21] Wani AL, Ara A, Bhat SA. Blood injury and injection phobia: the neglected one. Behavioural neurology [Internet]. 2014/06/24. 2014;2014:471340. Available from: https://pubmed.ncbi.nlm.nih.gov/25049451.

[22] Kumar N, Fatima M, Ghaffar S, et al. To resuscitate or not to resuscitate? The crossroads of ethical decision-making in resuscitation in the emergency department. Clin Exp Emerg Med [Internet]. 2023/05/15. 2023;10:138–146. Available from: https://pubmed.ncbi.nlm.nih.gov/37188357.

[23] Lewis JF, Zeger SL, Li X, et al. Gender Differences in the Quality of EMS Care Nationwide for Chest Pain and Out-of-Hospital Cardiac Arrest. Women's Health Issues [Internet]. 2019;29:116–124. Available from: http://dx.doi.org/10.1016/j.whi.2018.10.007.

[24] Cash RE, Leggio WJ, Powell JR, et al. Emergency medical services education research priorities during COVID-19: A modified Delphi study. J Am Coll Emerg Physicians Open [Internet]. 2021;2:e12543–e12543. Available from: https://pubmed.ncbi.nlm.nih.gov/34458888.

[25] Bateman RM, Sharpe MD, Jagger JE, et al. 36th International Symposium on Intensive Care and Emergency Medicine. Crit Care. 2016;20:94.

[26] Midani O, Tillawi T, Saqer A, et al. Knowledge and attitude toward first aid: A cross-sectional study in the United Arab Emirates. Avicenna J Med [Internet]. 2019;9:1–7. Available from: https://pubmed.ncbi.nlm.nih.gov/30697519.

[27] Misheck S, Chali E, Mulenga R. Drivers of gender-based violence amongst the students in higher learning institutions: A case of Kwame Nkrumah university. World Journal of Advanced Research and Reviews [Internet]. 2023;19:1464–1477. Available from: http://dx.doi.org/10.30574/wjarr.2023.19.1.1479.

[28] Heard CL, Pearce JM, Rogers MB. Mapping the public first-aid training landscape: uptake, knowledge, confidence and willingness to deliver first aid in disasters/emergencies—a scoping review. Disasters [Internet]. 2020;45:252–252. Available from: http://dx.doi.org/10.1111/disa.12374.

[29] Brooks IA, Cooke M, Spencer C, et al. A review of key national reports to describe the development of paramedic education in England (1966–2014). Emergency Medicine Journal [Internet]. 2015;33:876–881. Available from: http://dx.doi.org/10.1136/emermed-2015-205062.

[30] Gardia D, Mohapatra HS, Mishra AK, et al. Documentation of wound healing plants used by tribes of Nuapada District, Odisha, India. J Pharmacogn Phytochem [Internet]. 2022;11:111–113. Available from: http://dx.doi.org/10.22271/phyto.2022.v11.i5b.14482.

[31] Monchal T, Hornez E, Prunet B, et al. Hospital care in severe trauma: Initial strategies and life-saving surgical procedures. J Visc Surg [Internet]. 2016;153:3–12. Available from: http://dx.doi.org/10.1016/j.jviscsurg.2016.04.014.

[32] Tai NRM, Rasmussen TE. Epidemiology of Vascular Injury. Rich's Vascular Trauma. Elsevier; 2016. p. 13–20.