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| **Author, year of publication, country, respondent group and sample size** | **Data collection & analysis** | **Leadership outcomes or behaviours** | |
| **Quantitative data** | **Qualitative data** |
| **Clack.** *1994*, UK  Doctors >2yr post-graduate  (n=371) | Questionnaire **(Attributes rated as yes, partially or no)**  Quantitative | **Leadership attribute % prepared vs not prepared:**  Leadership potential – 20.3 vs 28.5  Team player - 64.4 vs 5.9  Adaptability – 37.9 vs 10.8  Ability to inspire confidence – 27 vs 13.5  Reflection – 15.8 vs 41.7  Recognise limitations – 48 vs 6.2  Interpersonal relations – 54.9 vs 5.4 |  |
| **Jones et al.** *2002*, UK  PGY1 & consultants (2 cohorts) (n=654) | Questionnaire **(Preparedness and competence rated as more than quite well, quite well or less than quite well)**  Quantitative | **Competency % prepared vs not prepared (consultants):**  (1999 results)  Communication - 83.2 (63.1) vs 2.9 (5.4)  Awareness of limits – 69.3 (64.6) vs 5.1 (6.1)  Teamwork – 83.2 (65.5) vs 4.4 (6.0)  Time management – 36.3 (41.8) vs 20 (17.6)  Audit & appraisal – 41.9 (30.7) vs 18.4 (22.7) |  |
| **Weller J.** *2004*, NZ  Medical students (n=33) | Questionnaire  Quantitative & Qualitative - coding into themes | Quantitative data not relevant to leadership | **Behavioural learning points (in order of frequency):**  ***Teamwork***  ‘defined roles lead to efficient and safe practice’  ***Task distribution***  ‘allocating jobs to be done within the team’  ***Leadership***  ‘don’t be afraid to lead’  ***Communication***  ***Managing stress*** |
| **Lempp et al.** *2005*, UK  Medical students (& same cohort as PGY1)  (n=17) | Interviews  Qualitative - Content analysis & simple counting |  | **Learning outcomes:**  Insufficient evidence - Effective use of resources, critical appraisal  Not met - Education & development  Partially met - Awareness of limitations, manage time effectively, audit & appraisal  Met - Work in a team, communication |
| **Wall et al.** *2006*, UK  PGY1 & Consultant  (n=405) | Questionnaire (6-point Likert**; 1= strongly disagree, 6= strongly agree**)  Quantitative | **Learning outcome (mean PGY1 vs cons):**  Respect for patients - 5.21 vs 4.86 (p = 0.000)  Communicating with patients, relatives & colleagues - 4.88 vs 4.39 (p = 0.000)  Team working - 4.99 vs 4.58 (p = 0.000)  Awareness of limitations - 4.87 vs 4.58 (p = 0.001)  Responsibility for learning – 4.67 vs 3.75 (p = 0.000)  Time management – 4.26 vs 3.82 (p = 0.000)  Decision-making – 4.01 vs 3.58 (p = 0.000) |  |
| **Illing et al.** *2008,* UK  PGY1 (n=479) | Questionnaires (5-point Likert scale**; scale not specified but upper end indicates prepared**), interview, e-portfolio  Quantitative | **Outcome mean rating by medical school (Glasgow vs Newcastle vs Warick):**  Leadership skills 3.8 vs 3.6 vs 3.6  Knowledge of healthcare system – 2.3 vs 2.9 vs 3  Speaking up – 3.5 vs 3.4 vs 3.4  Teaching – 3.3 vs 3.7 vs 3.6  Assertiveness – 3.7 vs 3.6 vs 3.6  Communication (colleagues) – 4.1 vs 4 vs 4.1  Communication (patients) - 4.1 vs 4.1 vs 4.1  Teamwork – 4.4 vs 4.3 vs 4.3  Respects others – 4.5 vs 4.4 vs 4.4 |  |
| **Varkey et al.** *2009*, USA  Medical students (n=21) | Focus groups/  interview  Qualitative - Inductive |  | **Skills rated as:**   * **competent**   Ethics, communication, conflict resolutions, time management, public speaking   * **minimal/not competent**   Managed care, coding & billing, writing proposals, investment principles, management principles, quality improvement, risk management, negotiation  **Other skills suggested as important by students:**  Empathy, compassion, trustworthiness, ethical & moral standards, communication skills |
| **Matheson C & Matheson D.** *2009*, UK  Supervising doctors (n=228) | Questionnaire (5-point Likert scale**; 1= poorly prepared 5= well prepared**)  Quantitative | **Skill mean score:**  Teamwork – 3.65  Awareness of limits – 3.85  Communicate (patient) – 3.71  Communicate (allied colleagues) – 3.16  Speaking up – 2.30  Consider patient view – 3.15  Determine personal needs – 3.02 |  |
| **Lüscher et al.** *2010*, Switzerland  New graduates & GPs (n=144) | Observation  Quantitative | **Behaviours observed no. new graduates vs GPs:**  Direction - 4 vs 14 (*p = 0.07*)  Decision-making - 23 vs 24/18 vs 17  Delegation - 13 vs 13  Negotiation - 0 vs 2 |  |
| **Eley D.** *2010****a***,  Australia  PGY1/2 (n=20) | Interviews  Qualitative - five stage framework |  | **Themes:**  ***Communication skills***  ‘These are difficult to teach in a university setting – often something better taught and learned through clinical application. We got communication skills, throughout, they could not have done better but what would be good is more emphasis on being a reflective doctor. Emphasis on reflection on our own practices so you learn how to be a reflective doctor.’  ***Patient management skills***  ‘RCS experience was strong here, we were always encouraged to be part of the team and day to day management was something really encouraged, Things like managing aggressive behaviour and breaking bad news.’  ***Interprofessional experience***  ‘I didn’t have a good idea of how allied health professionals interacted – it would be good for med students to follow them around for a day to see what they do, I see now how understanding the roles of others improves your work readiness for things like referring so you know who can do what.’ |
| **Tallentire et al.** *2011b*, UK  PGY1 & Consultants (n=192) | Questionnaire (4-point Likert**; 1= poor 4= very good**)  Quantitative & Qualitative -inductive | **Learning outcome (mean PGY1 vs cons):**  Communication - 3.24 vs 2.69  Social aspects - 3.10 vs 2.48  Psychological aspects - 3.13 vs 2.44  Self-directed - 3.09 vs 2.39 | **Themes:**  ***Non-technical skills***  “We received absolutely no training in most of the critical day-to-day relevant aspects of being an FY1: prioritising, managing and keeping track of a large workload of tasks and jobs, many of which will be completely unfamiliar…” (PGY1/2)  “Very few of the FY1 doctors will take any initiative…” (Cons)  “Although good communicators with patients, they are generally sub-optimal in their communication with other medical staff….” (Cons)  ***Personal attributes***  “I..was lacking confidence putting pen to paper as we went from no responsibility to high levels of responsibility overnight.” (PGY1/2)  ***Familiarity with ward***  “The only aspect of preparation for practice that I felt I lacked when starting was the practical experience of running a ward” (PGY1/2) |
| **Tallentire et al.** *2011a*, UK  PGY1&2, senior doctors  (n=36) | Focus groups  Qualitative -Inductive |  | **Themes:**  ***Roles & responsibilities***  ***(identity & expectations)***  ‘You don’t want to phone for help and them say “What have you done?” and you have to say, “Nothing.” Because that would make you feel useless. And you feel like “I’m a doctor now, I should be able to at least start to manage the situation.”’ (PGY1/2)  ‘There’s this prevailing attitude that FY1s are up against; that trainees aren’t as good now as they were in the past. That’s tough for them. Perhaps that’s why they seek out hard evidence before calling for help…’ (Cons)  ***Environmental factors***  ***(medical hierarchy)***  ‘I didn’t quite realise until I started how hierarchical medicine is….as soon as you are in the system as a junior, you realise that actually it hasn’t really changed that much. We are the foot soldiers. And you jump when people say jump. And you don’t talk back. And don’t question things. So speaking in a forceful manner in an acute situation to a “superior officer” goes against the grain and you know that you are going to be in big trouble if you do it.’ |
| **Meurling et al.** *2013*, Sweden  Medical students (n=54) | Observation **(4-point scale; poor, in need of improvement, good, proficient)**  Quantitative | **Observed behaviours:**   * Takes a team member role * Gather information & communicate * Contribute to a shared understanding of the situation * Make collaborative decisions * Coordinate & execute tasks   Behaviours unchanged after 3 consecutive scenarios (no values provided).  Gathering information & communicating – odds for leaders having a higher score were 3 times higher than for followers. |  |
| **Kellett et al.** *2015*, UK  PGY1 &  Consultant  (n=74) | Focus groups/ interviews  Qualitative -Thematic |  | **Identified leadership themes:**  ***Teamwork & collaboration***  Not part of a team as student/Don’t know how teams operate/lack authority (PGY1)  Lack assertiveness/need leadership & management training/quickly become confident with support (cons)  ***Raising concerns & seeking support***  Less stress if supported/lack confidence to approach consultant (PGY1)  Seek help/hierarchy/lack of escalation (cons)  ***Effective communication***  Miss feedback (PGY1)  Well developed with patients (cons)  ***Time management & prioritisation***  Feel pressured to say yes to colleagues/stay late to finish to avoid handing over work/overwhelmed/staff shortages (PGY1)  Lack ability to prioritise (personality issue)/less responsibility due to shift patterns/handing over work to colleagues (cons) |
| **Gordon et al.**  *2015,* UK  Junior & senior trainees  (n=65) | Interviews  Qualitative- Thematic |  | **Identified leadership dimensions (frequency mentioned during interviews):**  Behaviour (176), role (106), hierarchy (94), group process (82), personality (80), principles & values (59), responsibility (56), skills (35)  **Identified followership dimensions (frequency mentioned during interviews):**  Behaviours (76), active participant (44), group process (43), unknown term (35), passive (24), hierarchy (22), personality (17), role (16) |
| **Harvey et al.** *2015***,** UK  Medical students  (n=206) | Questionnaire  Qualitative - Deductive |  | **Non-technical skills identified (in order of frequency):**   1. Team working – ‘Make a plan before the ward round of the role of each team member on the ward round’. 2. Task management - ‘Prioritise jobs by finding out what is urgent and what can wait until the ward round ends’ 3. Situation awareness – ‘Have a huddle at the end of the ward round to discuss each patient and share all information with the team so you can prioritise jobs and see the bigger picture for each patient and share the plan for each patient’ 4. Communication - ‘Speak in an appropriate manner to patients’   ‘Don’t be afraid and have the confidence to ask the consultant questions during the ward round, if you are unsure, for clarification’   1. Leadership - ‘Explicitly delegate tasks to ensure that things aren’t missed’   Coping with stress & fatigue - ‘If you don’t feel confident then ask for help’ ‘Don’t be intimidated by the consultant’   1. Empathy - Don’t ignore the patients during ward rounds’   **Non-technical skills not identified:**  Decision making |